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AUGUST 1987

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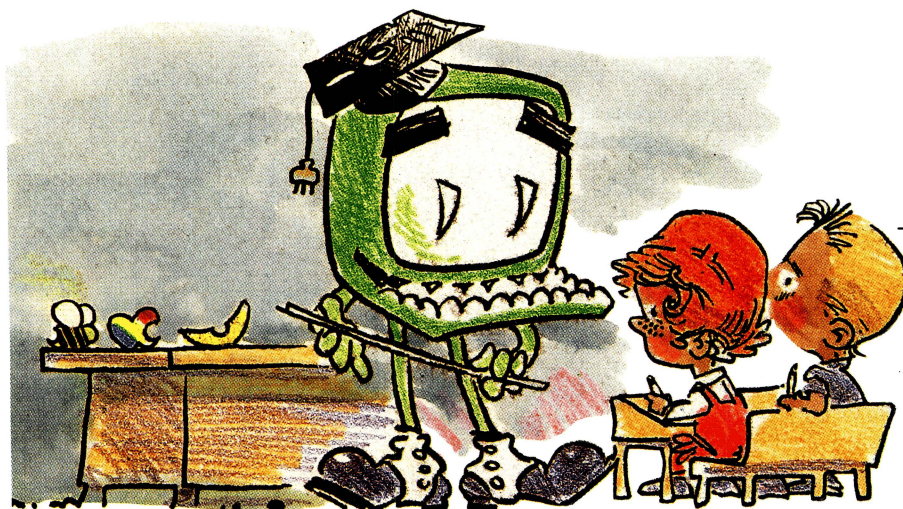


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HPY 063

your computer

AUGUST 1987



Computers and Education

Computers are playing an increasingly important role in education. This month we review their very successful use in Victorian schools.

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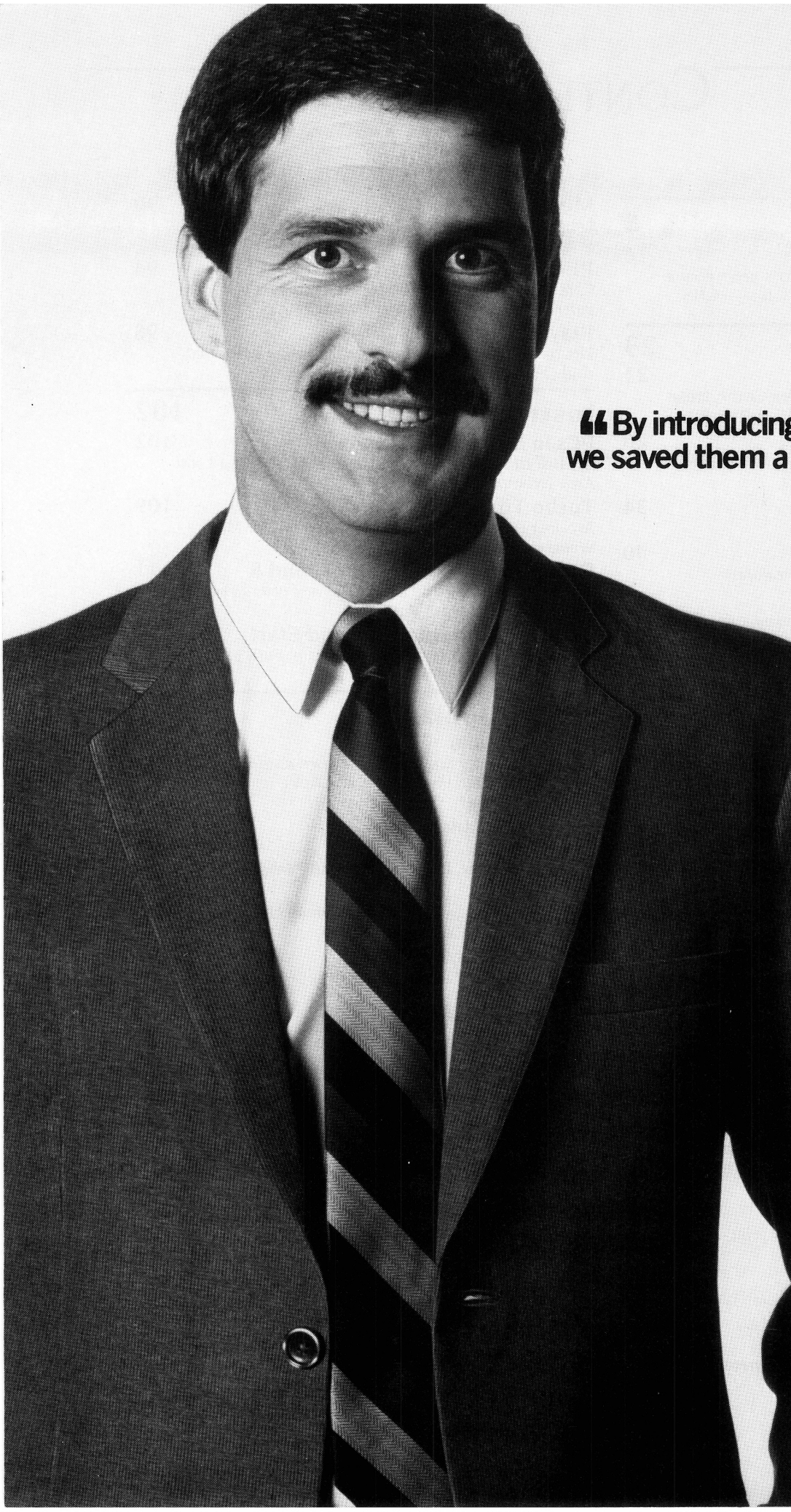
Apple software, a complete C64 system, a printer buffer, a CD-ROM drive, and more ...

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Ever thought about writing for YC — here's the fine print.

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... at Computer Widows and the Compusuit.



When a client comes to Unisys with a particular problem, often we've already solved the same problem for someone else.

So we simply put them in touch with each other.

For example, when the Brisbane City Council asked us to help develop a computer system for more efficient maintenance of their bus fleet, we

“By introducing one client to another, we saved them a fortune on software.”

Nick Conomo, Account Manager, Unisys.

introduced them to the Metropolitan Transit Authority of Houston, Texas.

We thought they'd have a lot to talk about, and we were right.

Eventually, software provided by the MTA in Houston formed the basis of BCC's Vehicle Maintenance System.

We've always worked very closely with the Brisbane City Council.

They're the largest local government authority in Australia (they also run the largest public bus service).

They're highly entrepreneurial and innovative, which makes them a very exciting client.

We work in the Data Processing Branch on a day-to-day basis but we're involved at a user level in most departments.

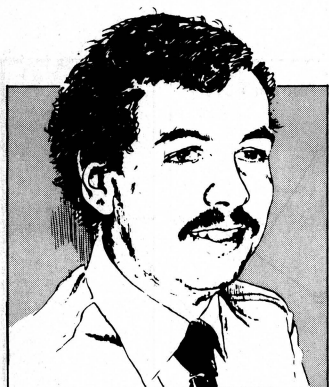
From Office Automation, to Library Systems, to Town Planning and even Transport.

We like to stay in tune with all their special needs and requirements and that means spending a lot of time there.

So much time, in fact, that it has been asked by an employee of BCC, which of their departments I worked for.

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Educated Non Techo Users?

A LITTLE LEARNING is a dangerous thing goes the aphorism and quite often that's true. It can often be the case in technical areas such as computing, where non-technical users can make dangerous assumptions about their hardware or software. However, it's not always true; and it's important to distinguish these occasions.

I recently read (in *Infoworld*, I think), an article in which the author proposed the view that end users should learn as little as possible about personal computers. End users, she wrote, have a job to do and they should concentrate as much as possible on getting that job done. Time spent playing with personal computers is counter-productive, and worst of all are users who spend time playing around with the machines.

This view, I have to say, is completely wrong. It is redolent of the old-fashioned attitude of data processing personnel that computing should remain their exclusive preserve, a realm of secret knowledge, and I suspect that this attitude may have more to do with the author's comments than any concern for the efficiency with which end users achieve their objectives.

But there are other reasons why end users should get involved. For a start, the whole idea behind personal computers is that of end user computing, a concept which IBM Canada tried to implement using mainframe terminals and the Information Centre in the mid-seventies.

The idea is that, instead of relying on expensive and overloaded computer professionals, end users should write their own reports off the mainframe database. This would provide users with the data they need, in a timely fashion, at a lower cost, and clear the backlog of work in the DP department.

Furthermore, the more users experiment with the software packages that they will use, such as Lotus 1-2-3, dBase III Plus and Framework, the more they will form habits, and it is when users form habits that they are most efficient.

If operation is habitual, then the user can concentrate on, for example, the underlying spreadsheet, rather than on picking the appropriate commands to create it.

Increased familiarity with software packages leads to increased usage on more advanced ap-

plications and it is here that the use of PC software really pays off.

Using a spreadsheet once a year to create a simple forecast is hardly worth the time and expense, but a macro-driven budgeting system which compares a sophisticated budget against actuals and produces several exception reports is very worthwhile.

This cannot be done by an inexperienced user with no involvement — nor can it be done by an analyst/programmer on behalf of the user.

Experienced users rely less on technical support staff for the resolution of simple questions. They only ask for help when they really get stuck.

The question is, who has the right to tell a user what he or she may and may not do with the PC? People get very attached to their computers when they were purchased using funds from their department budget, have typically spent many hours in training, and which they need to do their job more effectively.

But it seems to me that the two really important reasons for encouraging users to experiment with software packages are: firstly, that users will come up with innovative ways of doing things for themselves which would not have been obvious to the 'trained professional' and secondly, that providing trained professionals to nursemaid users is simply too expensive and too slow.

PC users initiate a kind of 'creative anarchy' within a company; they will create databases and spreadsheets of increasing complexity, come up with new applications that have previously never been attempted or even considered, and they will gradually evolve a new management style.

The rapid emergence of the Apple II/Visicalc and IBM PC/Lotus 1-2-3 combinations was in direct response to the fact that users' needs were not being satisfied by traditional ways of doing things.

And now someone suggests that we go back to the old ways of doing things?

I take heart from the fact that the majority of YC readers who would class themselves as end users know a lot more than the essentials required to do their jobs and, as a result, are more effective and efficient in doing them.

Les Bell

Next Month Includes . . .

Education

We continue our Feature on Computers and Education with details on what makes 'good' educational software, a guide to tertiary computer study, and a catalog of hundreds of educational packages — plus a look at computer tutorials on audio and video cassettes and video disks.

Microsoft Competition

Like to take part in our new competition and have a chance at over \$10,000 worth of hardware and software? All you've got to do is write less than 200 lines of code.

Desktop Publishing

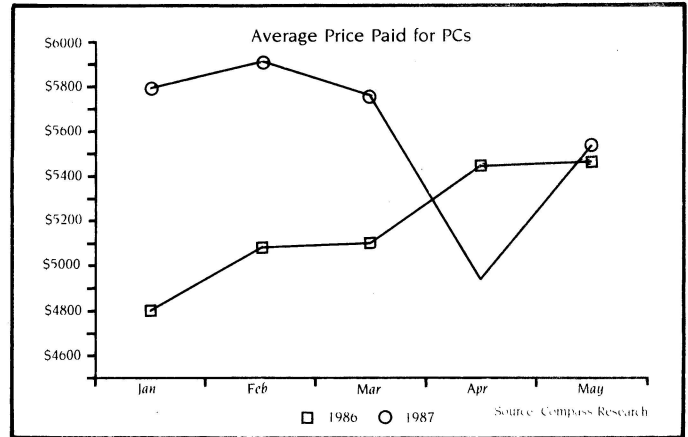
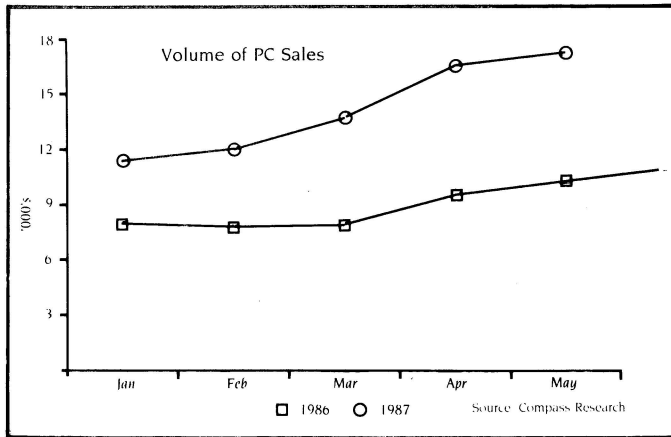
Matt Whelan HAMS it up with the desktop publishing package from HP, Aldus, and Microsoft.

User Groups

Computer User Groups are the biggest source of knowledge for users with any level of experience. If you own a computer and you're not a member of a Group, your Micro's probably not working as hard as it could (we hear they even have fun at meetings!)

Laptops — Sleek, Powerful and Versatile

Ian Roberts continues her survey of laptop computers with a comparison of the NEC Multispeed, the Gridlite and the Toshiba 1100 Plus.



COMPASS CORNER

DESPITE THE FACT that life's expenses seem to be piling up, and the weekly bills seem to be mounting, the computer industry retail prices are actually static, according to Compass Research.

THIS IS DESPITE the significant falls in recommended retail pricing in recent months and an increase in sales of 80286-based PCs. The latest figures show that the 80286 based PCs account for more than 33 per cent of all PCs sold through dealers in the Australian market.

As a result of this competitiveness, the price of the PCs has dropped due to the introduction of the NEC Powermate, which has been priced significantly below other major brands. While IBM's introduction of the Personal System/2 family has also helped the price reductions of the PC's.

The high volumes recently by clones was a direct turn about to the reaction anticipated by IBM in the month of its worldwide release of the PS/2 machines. This, however, could have been a reflex reaction to the IBM announce-

ment, rather than an indication of a move away from IBM.

However, the average price of PCs purchased has shown a substantial increase. The increases can be attributed to a stabilising of the market following the IBM announcements, and increased sales of the high-end Compaq models include the Portable III and the Personal Computer of the Year, the DeskPro 386. The first significant volume sales of IBM's PS/2 models have also boosted the 'average price.'

Although some major suppliers are talking of introducing very low-cost PCs — less than \$1500 for a standard system with a 10 Mbyte hard disk drive. Compass Research believes that Australian users traditionally buy up to a configuration (as exhibited in the enclosed graph) and that the actual price paid by end-users remains fairly constant.

Hence it is unlikely that low cost entry-level PC's will gain market share against the faster and more powerful 80386 and 80286-based PCs. Combined with the effect of IBM's announcement on corporate organisations, it is anticipated that there will be only marginal price erosion of the average price of PCs in 1987. □

AUSTRALIAN WINS INTERNATIONAL TOURNAMENT

DR BOB MARKS, a senior lecturer at the Australian Graduate School of Management at the University of New South Wales, has outfoxed 42 of the world's smartest marketing strategists (well, in theory). He won an international computer tournament run by the prestigious Massachusetts Institute of Technology (MIT) in Boston.

THE US\$600 prize money (which Marks is planning to spend on some software for writing recorder music) may not sound like much, but it's the prestige Bob will get in in-

ternational management science circles which is important. After all, the sort of computer games they play around with at MIT are not for the faint-hearted.

The tournament — which is based on the classic Prisoner's Dilemma: the dirtier you play, the bigger the bikkies, but the bigger the risk that your opponent plays dirty too — invited participants to create a subroutine to achieve maximum profits against two competitors, using (and we quote) a symmetrical multiplicative profit function with varying price elasticity.

Marks said, 'It's all a matter of incorporating your contingent strategies into the sub-

routine to deal with all eventualities. Basically, the lower the price, the higher your sales, but you don't want to have such a low profit that you wipe yourself out.'

Marks figured out his strategies on the AGSM's DEC Vax 11/780. □

SCHOOLS WAIT DEEP DOWN UNDER

NEW ZEALAND schools are waiting on a survey being carried out by their Education Department on the benefits of the meager amount of computers currently in their schools, which will lay the way for any future investment by the NZ government in computers for

schools.

NINETEEN PAPERS, due for release later this year, will look at and advise on a range of topics covering software and hardware applications, and on the needs of special schools, rural communities and the different sexes.

Unlike Australia, the New Zealand Government has no policy on the implementation of computers in local schools and, as a result, provides no funding for their provision. This has not stopped nearly all of the 3000 schools in New Zealand from investing in at least one computer per school, through P&T organisations and local community groups. ►

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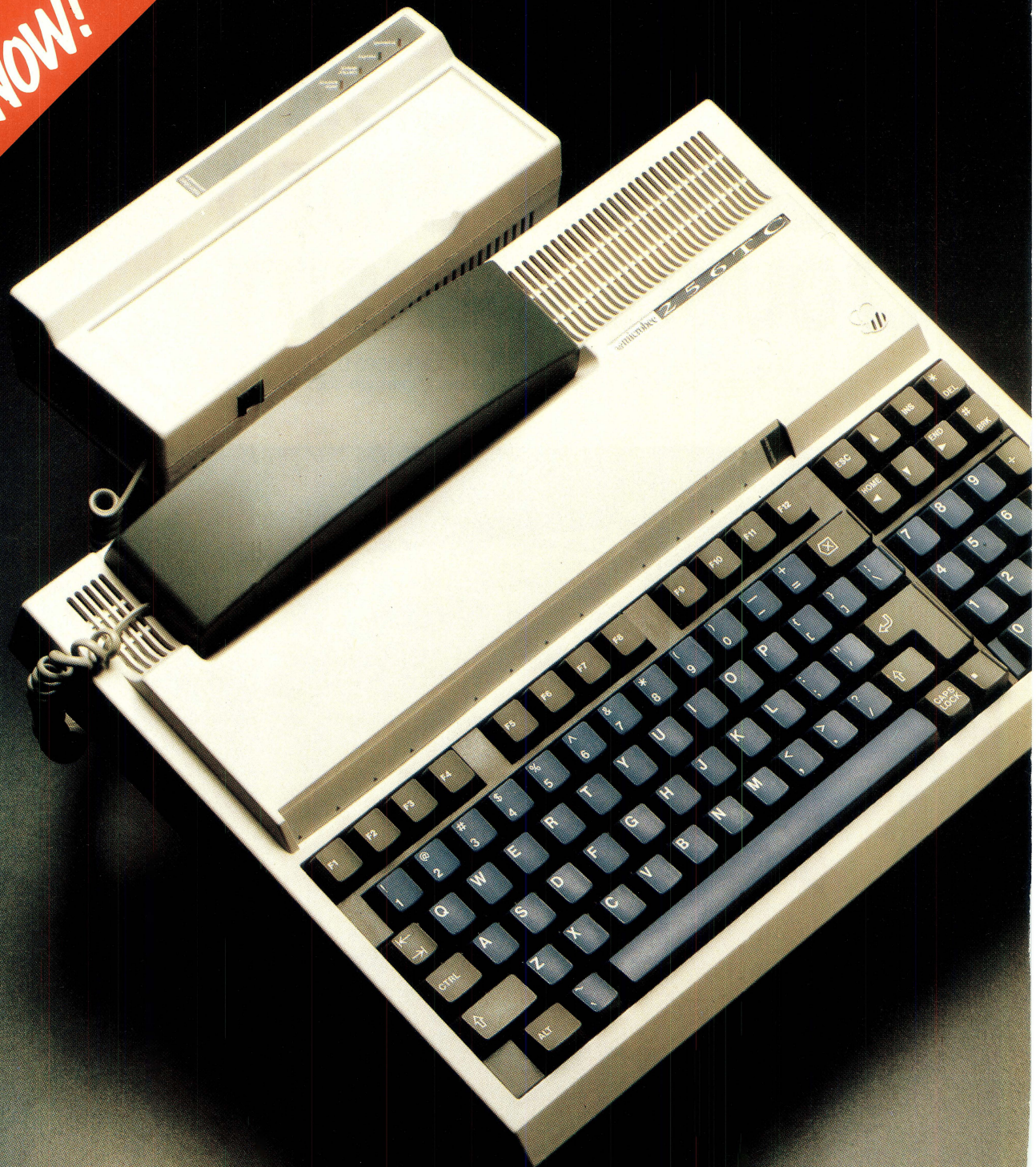
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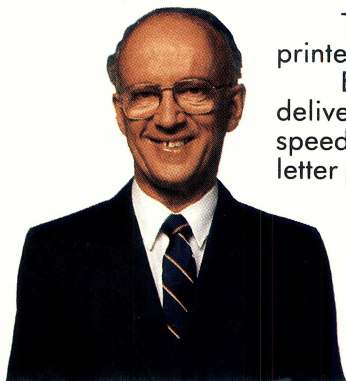
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KIDS AND COMPUTERS

COMPUTERS ARE tools, and in the hands of children who have imagination, computers can become the ideal teaching tool rather than mastering students with mind numbing games.

ACCORDING TO Anita Stalker, former director of the now defunct primary micro-electronics education program (MEP) in the UK, in a discussion with delegates at the NSW Computer Education Group's fifth annual conference at Leura (NSW), in the view of British education leaders, games were out as a teaching aid, and computers had to provide basic teaching.

Stalker has developed several primary adventure games for the BBC range of computers, which are designed to stimulate thinking in an adventure type environment.

In the adventure game, the Lost Frog, children help a frog out of a house and into the garden. It involves drawing maps, thinking, writing and discussion.. ☐

This has raised the problem of no cohesiveness between schools as to the purchase of computers, each schools buying what it could afford and what was available. It will be interesting to see the result that this will have on the New Zealand industry when the students begin to work in the computer industry.

The reports on the effectiveness of computers on students will be used to develop policy for future investment in their schools. All the studies were begun early last year and all will run until at least this month. Draft interim reports have already been prepared for submission this month.

Initial findings have shown that in primary schools there is an interest in wordprocessing, interactive fiction, simulation and problem solving and in secondary schools and an in-

terest in wordprocessing, accounting, economics and geography in secondary schools. ☐

SCHOOL OF THOUGHT

WEST AUSTRALIAN Schools have been given \$3.76 million to buy 2600 computers for their state schools — making the State one of the forerunners in the development of computer literate children.

AN AVERAGE of three computers will be provided for each primary school and one computer for every 40 students in high schools. With investment by parent and teacher organisations in some of the State's schools and the putting aside of money by some schools already, the ratio of students to computers will actually be less.

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the next State budget, the Minister for Education, Mr Pearce, said the program meant Western Australia was providing more computers for schools than any other State.

This investment has followed the suggestions put forward by the Educational Computing Association of Western Australia and the Western Australia Council of State School Organisations which found that many of the State's schools did not have any computers and this meant the State was lagging behind. □

EVENTS

The Comtec Committee is holding a series of software exhibitions in Sydney August 17 to 19, and Melbourne September 28 to 30. Contact (08) 363 1757.

An inaugural two-day DEC User symposium will be held at the Pan Pacific Hotel in Singapore

on August 31 and September 1. A six day DEC users convention will be held at Observation City, Perth from August 23 to 28. Phone Carolyn Bennett for details on (02) 412 7144.

The Comdex Show will be held on August 19 to 21 at the RAS Showground. For exhibition bookings, contact (02) 959 5555.

Engineers and Scientists should be interested in the international conference on computational techniques and applications for large scale engineering and scientific problems. The conference is to be held in Sydney on August 24 to 27. Contact Dr Clive Fletcher (02) 692 3539.

The Institute of Personnel Management Australia (Vic) is holding a conference and users fair on Human Resource Management Systems on September 9 to 11. Phone (03) 387 9955.

Infotec '87, the computer and communications exhibition for government, will be held in Can-

berra on November 3 to 5. Contact (02) 959 5555.

IRECON '87 will be held on September 14 to 18 at the Sydney Showground with the theme, The Digitisation of Communications. Contact Sherie Morris (02) 327 4822.

Papers are being called for ACC '87, the official conference of the Australian Computer Society, to be held in September. The Conference theme is the MBA Experience, or Management, Banking and Artificial Intelligence. Contact Bob Pritchard on (03) 699 8622.

The Institute of Personal Management Australia (Vic), is holding a conference and user's fair on human resource management systems on September 9 to 11. Details (03) 387 9955.

The AUUG winter conference and exhibition will be held in Sydney on August 27 and 28. Contact (02) 218 9437.

The Australian Society for Computers in Learning in Tertiary Education has called for papers for its annual conference, to be held in Sydney on November 30 and December 2. The deadline for papers is August 28. Details (02) 697 3175.

The Swiss Federation of Informatics is seeking papers for the European conference on Computers in Education in July 1988. The deadline is October 30. Address inquiries to ECCE 1988, Professor Bernard Levrat, Centre Universitaire d'Informatique, 12 Rue du Lac, CH-1207 Geneve, Switzerland.

The SAS User's Group of Australia has extended a call for papers for its third annual conference to be held on October 7 to 9 in Canberra. Papers describing real world applications of software in the SAS System are appropriate. Contact (02) 908 2244.

Deltak Training Corp, is holding courses on DP, information systems, industrial and manufacturing areas. Contact Stephen Hughes (02) 957 2622.

Pheonix Computer Systems of Newcastle (NSW) is holding courses on dBase, Lotus, MS/PC-DOS, Decmate Wordprocessing, Symphony, Reflex and HAL. Contact Jenny (049) 26 3388.

Oracle Systems is planning courses in Sydney and Mel-

bourne on database administration, programming utilities, and introduction to SQL. Contact Evelyn Schultz (02) 959 5080.

International Spectrum Australia/Pacific Conference and Exhibition, Centrepoint Convention Centre, Sydney, October 26, 27, 28, specifically addressing the Pick operating system based marketplace. Further information from IDBA, 133 Alexander Street, Crows Nest, NSW 2065. Phone (02) 439 5488.

ACE '87, the Australian Computing Exhibition and Conference, will be held in Melbourne on September 8 to 10. Contact Karen Hucks (02) 211 5855.

A Conference on Australian Computers in Education, will be held at the Adelaide Convention Centre on September 28 to 30 with the theme, Tomorrow's Technology Today. Ring (08) 227 1824.

OVERSEAS EXHIBITIONS

CommuniTech and Computer '87 Malaysia: The second Malaysian International Electronic Communications, Office Technology and Business Computer Show, will be held at Kuala Lumpur from November 10 to 14. For more information contact Australian Exhibition Services on (03) 267 4500.

An inaugural two-day DEC User symposium will be held at the Pan Pacific Hotel in Singapore on August 31 and September 1. A six day DEC users convention will be held at Observation City, Perth from August 23 to 28. Phone Carolyn Bennett for details on (02) 412 7144.

The Malaysian National Computer Conference will be held in Kuala Lumpur on August 12 to 15. Write to the Malaysian Society at PO BOX 1128, Jalan Pantai Bharu, 59700, Kuala Lumpur.

The EDP Auditors Foundation Conference: The 18th Conference is to be held in Atlanta, Georgia, US on the 10 to 15 of April 1988. Submissions to talk on areas concerning audit, control and security are welcome and must be received no later than September 11 1987. Write to The Program Chairman, The EDP Auditors Foundation, Box 88180, Carol Stream, IL 60188-0180 or telephone 312/653-0950. □

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AMERICAN GRAFFITI

BY HOWARD KARTEN

COMPUTERS AND EDUCATION

THE EDUCATION establishment seems to operate on a regular excitement/disappointment cycle about computers and it looks like we're once again in the excitement phase of it.

Perhaps this time, the Education Business (Ed Bus) will manage to temper its excitement somewhat, think about micros in a more realistic way and work more closely with software developers. If so, maybe this time around the incredible (and thus far only surface scratched) power of micros will actually show up in some of the places where education is done — like the classroom, the family recreation room, the office, and the shop floor.

Educators have entertained pleasant fantasies about computers for almost as long as programmers have been debugging. The Ed Bus operates on an almost regular cycle: excitement about the potential of technology as an educational tool, followed by inept or inappropriate implementation of computer-assisted education, then a backlash that concludes with much talk about 'fundamental values' and 'back to basics.' (Given the constants of human behavior, this no doubt is as true of the Australian Ed Bus as it is of the American Ed Bus.)

In part, the excitement phase of this cycle seems to be triggered by new technologies. The growing importance and commercial availability of technology such as videodisks, CD-ROM software and hardware, speech output (not exactly a new technology), and others, combined with ever-dropping prices, have teachers excited again.

That's good, because we badly need a way to supplement formal education: the level of public information or education often encountered today (especially involving recent high-school graduates) does not inspire ex-

cessive confidence in our educational system.

At my computerised supermarket recently, the clerk had to resort to laborious calculations with pencil and paper when I sought to buy only three of the doughnuts that were selling for six for 90 cents! It's difficult to avoid the conclusion that the teachers need lots of help, and soon, too!

It seems eminently reasonable that computers should finally be on the verge of contributing in a really big way to education, since they've certainly contributed their fair share of negative effects to education.

For example, the proliferation of micros throughout business has significantly shifted the knowledge base a modern employee, or a modern student, needs to cope with successfully. If you want to succeed in almost any job in business today, it's almost a requirement that you know how to operate (or be able to learn in short order) a word processor and a spreadsheet package. Adding another skill to the already long list of skills needed just to compete (let alone win!), doesn't make life any easier for anyone.

Computer games are another example of how computers have had a negative impact on education. There's nothing wrong with playing a video game now and then, but they seem to have an almost hypnotic effect on kids (and — let us be candid — on some adults, too).

The splashy, fancy graphics and sound effects so often seem to mesmerize kids and take the place of books. Playing with bulletin board systems, too, has a certain built-in excitement that can become near-addictive. And I often suspect that the reason for disappearing maths skills among the general population has something to do with calculator ubiquity.

A couple of serious structural problems have always dogged educators seeking to unleash the power of computers. Probably first and foremost is that those

seeking to 'open young minds to new experiences' (as the cliché goes) themselves sometimes seem to be awfully closed-minded and fearful about computers. No doubt they're not thrilled that so often, the teachers are smarter about computers, more comfortable with them, than the teachers.

Another problem is that from a business perspective, the education market is not really big enough, nor free-spending enough, to tempt software developers and distributors. Moreover, the Ed Bus has gained a reputation as folks who have few qualms about making — and distributing — unauthorised copies of software.

There's a vast market out there waiting to be tapped. Thus far, most of it seems to be aimed at the traditional student market, although the adult market is probably even larger. (Take a look, for example, at all the 'self-help' or 'self-improvement' titles in your neighborhood bookstore.)

In the development of this market, one of the especially important things will be to avoid over-excitement and viewing the computer as a panacea, as has so often happened in the past. It would be sad if hardware and software were to wind up substituting for the interaction between kids and parents: sitting in front of a colour graphics tube might be fun for a while, but could hardly take the place of a nice soft lap and a parent spending an hour or two reading to a pre-schooler.

Computers lack the warmth and inspirational qualities of a good teacher; it's hard to imagine anyone looking back fondly, 10 years later, on 'that wonderful piece of educational software I used...' Paradoxically, the answer no doubt lies with recent graduates of the educational system everywhere. Take a look at the entrepreneurs, the real innovators and heroes of the micro-computer industry, and it quickly becomes evident how many visionaries and younger folks are

involved, people who don't know the meaning of 'can't be done/never been done'.

I suspect that this portends that it won't be the grey heads in the Ed Bus who bring micros up to their full potential in education, but the younger folks, the same ones who've captivated us with the splashy graphics I mentioned earlier.

No doubt the 'Steve Jobs of Education' is working away in a garage somewhere, developing a product that will help all of us reach our full potential.

Now, if only he (or possibly she) can come up with something that will teach me how to plan better and avoid having to rush to meet my monthly copy deadline...

NEWS NIBS

□ IBM's April announcement of the Personal System/2 family continues to have reverberations throughout the US microcomputer industry.

That announcement, as well as the growing number of 80386-based IBM PC clones, has stimulated a great deal of activity involving or relating to the Intel chip.

For starters, several American companies have announced boards using the 80386 chip, intended for PCs, XTs, and ATs. The boards give current machines the power and speed of a true 80386-based machine, according to the vendors.

Hauppauge Computer Works (New York), has two 386 Motherboard replacements (one for the PC, one for the AT) for US\$1,495, and (as of mid-June), Quadram (Georgia) was expected to announce a similar product by July, at the same price.

Also, California-based, Milpitas Chips and Technologies, said that it had successfully reverse-engineered the IBM Micro Channel Architecture that's one of the keystones of the IBM PS/2 family. The company said it expects to have chip samples ready by the end of the year, which could lead to the appearance of PS/2 clones by as early as the beginning of 1988. □

Have you developed an interesting use for Framework? Or found a new use for Fred? Or, maybe, you've just got a Framework wish list. Now's the time to tell us about it — this is your last chance to enter our \$3000 Framework competition! For inspiration — here's an interview we had with Robert Carr, the man who had the satisfaction of creating, Framework...

Framework

CARR VISITED Australia to speak at APCON, the users conference conducted by the Sydney PC Users Group, we took the opportunity to find out more about him, Framework and the inner workings of the American software industry.

Interviewing Carr were Dr Robert Fletcher (PC Gynecologist), Brad McMaster (PC consultant with InSoft) and Paul Zucker (PC Consultant with Les Bell and Associates).

YC: *We are interested in innovation in software and how products come to be born, and how they come to the marketplace. Our readers would be interested to hear the history of how Framework came about — who created it, what the original ideas were, and how it came to be where it is at the moment.*

Carr: Sure. Well, I created Framework, and, in some ways, looking back now, it seems like my jobs and my various kinds of experience with computer software were designed to lead up to Framework.

YC: *You were writing application software, or system software?*

Carr: It was system software. I was developing part of a database that was going to be part of an integrated office system. This was 1978, before spreadsheets were invented, even before we knew about them.

YC: *Was this at the famous PARC?*

Carr: Yes, this was at PARC. It was a system very similar to what Xerox ultimately came out with as Xerox Star, and so it had all your different kinds of software: word processing, graphics, forms and records management, and database. That was an integrated software system, and I worked there and then left them to go back to school and travel.

My next job was in Los Angeles for a company called Context Management Systems, that had the idea (this was 1980-81): 'let's take a single giant spreadsheet, let's add in database, graphics, and word processing capabilities.'

They called it 'Context MBA'. We shipped it six months before Lotus 1-2-3, a very similar product to 1-2-3 and to our minds, technically speaking, better in terms of functionality. But it had two key problems. One, the marketing wasn't nearly as good as 1-2-3, and secondly it was very very slow in execution compared to 1-2-3.

The reason why it was slow was that when they started out they felt that the PC marketplace was going to be fragmented, with a lot of incompatible machines having 10 to 20 per cent market share apiece, so they said they needed to write their software so they could easily port it across all these machines.

They picked an operating environment called UCSD Pascal which was very portable. Your applications could be run, almost without change, across different hardware. So we shipped and we were starting to get some sales but we did have our problems, and then 1-2-3 came out and right around the same time the IBM PC was just exploding, and they stole the market.

I was working on Context MBA — I hadn't helped design it at all. They did all the design on paper and started programming, and they hired one or two people and then hired me. So I helped implement a lot of it, and as it got finished and I started seeing what the whole design was like.

I really liked the idea of letting the user have word processing, spreadsheets, and graphics, and

all that, at the same time, but I didn't like the idea of it being all in one big spreadsheet. In fact I really disliked that, I thought it was wrong.

I was thinking about it and I got the idea: what would happen if you could go to a spreadsheet cell and open it up and find another spreadsheet inside of it. And almost right away I drew a picture of how that would look on the screen. I drew a picture of one square or window and inside of that I drew another window, and it just clicked.

I got the idea that you could window inside of a window, and that was the start of it. I think that's one of the things that helped Framework, that I had the luck of having the vision right at the beginning that carried me all the way through, because Framework in the end finished up being exactly that — a window inside a window — there's a lot of the product right there.

YC: *Did you coin the term 'Framework' or did someone come up with that later? What were its previous names?*

Carr: Not me personally. I had this idea and I worked for Context for another five months. In fact, I talked to them about pursuing the idea. They said it was interesting, but they were going to do the next version of Context MBA which was going to be much better... So I said I would go off on my own and do this and pursue my idea, and I started doing that. I tried to come up with a really great codename for the product.

YC: *You had left Context at this stage, and you were funding yourself?*

Carr: Yes, I was just living off my savings. I wanted to come up with a really meaningful name, but I couldn't. At the time, whenever I had a floppy disk that wasn't anything in particular, a scratch disk, I would call those floppy disks Fred — it was just the name I used.

YC: *So it doesn't stand for FRAMES Editor after all!*

Carr: No, well, I never myself dreamed of FRAMES Editor as an acronym. I came up with that as a nickname.

YC: *Ashton-Tate provided the capital at that stage?*

Carr: Yes. And we got together a team of seven and worked for another six months or whatever. About three months away from announcement time, we started to get nervous about the name. Everybody was trying to come up with a name, and Ashton-Tate marketing was doing a horrible job. At one point they came up with the name GUS — Global User System!

Anyway, one night two other people and myself from my company were standing around talking about Framework in the doorway of our offices when in the course of talking about what it was that Framework did for a user, someone said 'what it does is it lets you create a framework of your information...', and about three sentences after that word 'framework' came out we all just stopped and looked at each other. We decided to send it down to Ashton-Tate marketing, and next morning we phoned it down.

YC: *And they said 'go for it'?*

Carr: Oh no, it was actually after we gave them the name 'Framework' that at one point they came up with the name GUS. Ashton-Tate marketing decided to have a retreat — it was only a couple of weeks before the announcement in New York — to go away for a weekend and get creative, and let the juices flow, I guess with regard not just to Framework but all their marketing programs.

They came back from this weekend, they called me up, they called other people: 'We've got it! We've got the name! There's never been a name better than this. You'll never guess. It's — GUS.' And so for about three days there was this huge battle, shaking people by the shoulders and saying, 'Come on, listen, let reality sink in, you really don't want to use that name.'

YC: *Were you calling frames 'frames' at that stage?*

Carr: Yes, from the start I called frames 'frames' to set them apart from windows, because they're similar but they've got a couple of key differences. So the product was called Fred as the codename all along. And then when we came up with 'Framework' and that became the official name,

In Perspective

we were left with the question of what to call the programming language. Everybody was fond of the name Fred, and that had been one of the candidates for the final name also, so we called the programming language Fred.

YC: Did you approach Ashton-Tate with your ideas and suggest that they fund you?

Carr: Yes, when I was developing Framework on my own, I didn't have my heart set on any particular route. I thought it would be a good product. I also thought that what I had to do was to implement enough of it so I would have a good working prototype before I could get anybody interested.

YC: That was my next question — how much you had implemented when you went to see them?

Carr: The internal technology in technical terms is recursive — things are implemented in terms of themselves — and the whole scheme is based around that so that at first nothing worked, but after a few months, once I got to the point of frames working, all kinds of things happened.

After about six months of programming I really had a prototype Framework working that was very similar to today's Framework. There was the desktop, the pull-down menus various types of frames.

YC: Written in C?

Carr: No, in assembly language. About one third of Framework is written in C — the graphics, and the Fred language interpreter. So I got to the point after six months of having a very capable working prototype, at which point a guy named Marty Masner came by to visit me in San Francisco.

He had been VP of marketing for Context Management Systems, and after I had left, he had left. He had ideas about starting another company, and came up to talk to me about that.

I could relate to that. I said, 'Great! In fact, let's make it a dream environment for programmers. We'll make it the best company for programmers that ever existed. I'll make it just what I've always wanted. So, we got a list of companies for him to go to.

Our first choice was Ashton-Tate. They were the number 5 or 6 publisher back then.

YC: So what products did they have? Just dBase?

Carr: Just dBase then. This is back in '83 in the summer. The number one company back then was Visicorp, for instance, and nobody knew that Visi-On wasn't going to be a big success. Micro-Pro was probably number 2. But we didn't want to go with those companies. So our first choice was Ashton-Tate, and then the next choice was the number 6 company around, which was Lotus which had just whipped our pants at our previous employment place.

Marty called up Ashton-Tate — I think he vaguely knew David Kohl in passing — he said, 'I've got a product I've got to show you.' And Kohl said, 'Gee, thanks for the offer, but I can't. I just don't have time.' But Marty said, 'No, you've got to see the product. This product's very different, it's a great opportunity for you.' Finally Kohl said, 'Ok, one hour, no more than that.'

A meeting was arranged for the next Wednesday. Then Marty called up Mitch Kapor of Lotus, who said he was interested and wanted to see the product, and arranged a meeting for the Sunday after.

We went in for the one hour, and after about 20 minutes they asked us to stop the demo while they brought in more people, and they eventually brought in George Tate and Hal Ashley. So the one hour stretched out all afternoon, and we stayed at David Kohl's house that night to talk about it. By the next afternoon we had a 'done deal' with them, where they said they would publish the product and fund Forefront. We called up Lotus and cancelled the meeting.

YC: Another question I wanted to ask — I suspect I know the answer already — the FRED programming language in Framework, which is so well integrated with the product — was it part of your initial concept that there should be a programming language that would tie all the facilities together?

Carr: Yes, it was, although the form that it actually took in the end was not quite what I had



hoped. I had originally hoped to be able to implement a very small kernel of Framework that would also have a extensible language associated with it, and then be able to implement all the rest of the functionality in terms of that language.

YC: It's a great idea but it would be too slow to be practicable.

Carr: Well, I was ignoring that problem, but I just couldn't figure it out, and so ultimately I decided to leave the language part out and see if I could just build the system by itself, and that's what I ended up doing. So when I went to Ashton-Tate, that was one of the things that just wasn't there at all.

I hired other people when we added the language, and we made what was a very fundamental decision back then: that it was going to be an extension of the traditional spreadsheet language, and that's what really determines the whole nature of FRED.

There were other major routes we could have taken. We could have made it very dBase-compatible in terms of language. Coming from Ashton-Tate, in retrospect, I would have made ties to dBase stronger and also made our language dBase-compatible in some fashion. Programmers would have gone for that.

The language is bound to the notion of frames. It's an almost visual, 3D attitude toward programming. Programs are invisible to a certain degree since they are formulae hidden behind frames rather than one long tract of code.

YC: Was there any particular language that inspired you in putting together the syntax and semantics of FRED? Forth, for example? There are some aspects of FRED which are quite special, such as the ability of programs to construct pieces of themselves and then execute them, which is essential to

the use of certain functions.

Carr: The traditional spreadsheet formula languages, Lisp, and perhaps even Pascal to a certain degree.

YC: There seems to be a barrier to penetrating FRED for most users of Framework. Most users of software on PCs are not professional programmers. Most of them would pick up Framework because it's a nice, friendly product, and you can do a lot with it without learning anything very technical. But then as soon as they want to penetrate FRED, well, FRED is something that someone with a Computer Science background is better suited to understanding than someone who is not only a non-computer scientist but a non-programmer anyway.

Carr: Do you think that has to do with the language itself in terms of its syntax, or more the way it tends to be structured in the frames, attached to frames.

YC: I don't think the attachment to frames is any barrier whatsoever... I think it's the fact that every FRED program is a formula to be evaluated, and also the lack of friendly, non-threatening documentation to help you get into FRED has been a problem in the past.

Carr: How do you like the Developer's Handbook, from Ashton-Tate?

YC: Bill Cling's book? That's the best one. One last question though. Regarding marketing, what is the place of Framework in the US? The impression locally is that people are impressed by demonstrations, the magazine reviews are all good, but its niche seems to be smaller here than it should be. Here it's never been clearly differentiated from Lotus. you can say to people, 'Framework has a programming language', and they reply, 'Yes, but Lotus has got macros too', as if they're the same thing.

Carr: To some degree, one of our mistakes was positioning ourselves against Symphony. Symphony was originally marketed as an integrated program, but quickly turned into a just sort of super-spreadsheet, so that pigeonholed us, so that a lot of people think of Framework as just a spreadsheet. Against Symphony, originally they outsold us about 10 to 1 in 1984 when we first shipped. But now we've, in the US, gained to about 2 to 1 or less, but we haven't quite overtaken them yet. □

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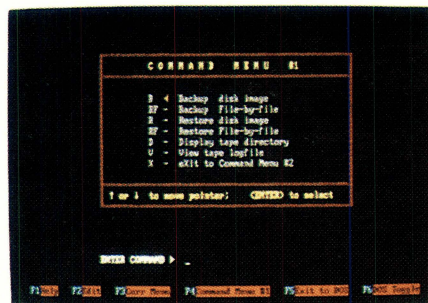
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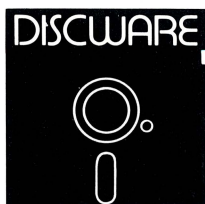
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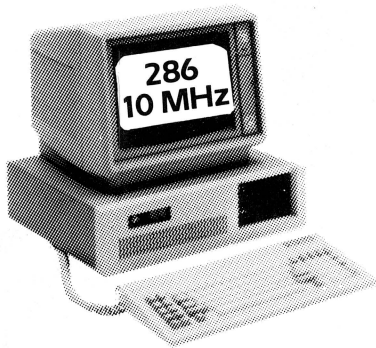
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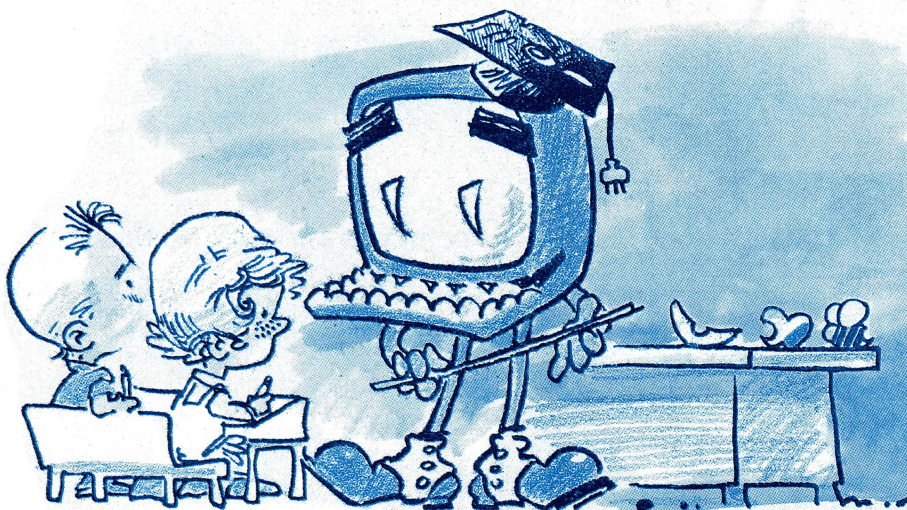
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Computers in Education



Update from Victoria

There are two aspects to 'computer education.' One is the use of computers to teach traditional school subjects — spelling, geography, mathematics and logic, for example. It's in these two last-named disciplines that computers really come into their own. This is well demonstrated by a number of the software packages we're reviewing this month (and next). Packages such as muMath and Modula-2 — powerful in their own right — are being used as powerful teaching tools. Then we have packages that were specifically written as tutorials — Sort, for example, which is being used to teach the concepts of data sorting

As an interesting aside, we've included a review of Hewlett-Packard's HP28-C. We believe this is the first hand held calculator that can handle symbolic logic, as well as matrices and integration; these are areas that have previously been only within the realm of mainframes. This menu-driven machine with its 'dynamic' stack is raising even more questions about the teaching of mathematics than did the introduction of calculators to school exams.

One of the best demonstrations of how computers can be used to teach in schools must be LogoWriter, an enhanced version of Logo which is a programming language

for children. It's also being used, with great success, to teach geometry (and graphics) and English (and wordprocessing) to eight and nine year olds.

The other aspect of 'computer education' is the use of computers to teach about computers, both in home and at school. Next month we'll look at packages in that category, including ones that combine the computer with audio and video cassettes and video disks.

Next month we'll also discuss what makes good educational software, what courses a student should follow for a career in computing (and where they're available), and the use of computer bulletin boards for teaching. We've rounded that out with a catalog of available educational software.

The Education Ministry in Victoria is probably the most dynamic of the state education departments in the use of computers for teaching. We asked John Kerr, Professional Development Co-ordinator for the Victorian State Computer Education Centre, to bring us up to date on the use of computers in his state's schools. (Next month we are also surveying the other states' education departments).

THE EDUCATION Ministry in Victoria has devoted a good deal of money to train teachers in the use of computers. As well as the State Computer Education Centre, the State boasts 12 fully fledged Regional Computer Education Centres, each staffed with a full time manager and consultant. In the country regions, a sub-regional centre is located mid-region to accommodate teachers in the more remote schools. The Regional Centres have the task of providing a myriad of courses for teachers. Over 120 courses are conducted each month throughout the State, ranging from computers in infant grades to computers and music creation. The Computer Education Program regularly provides more than 10,000 places per year for teachers at these courses, making it the largest program of its type in Australia.

From 1984-86, nearly 1,500 post primary teachers were given 5 day training courses as part of the Commonwealth funded National Computer Education Program. When the funding ceased, this program stopped but the State Government continues some funding so that primary teachers can be trained at 3 day courses run at the computer centres. These two programs have lead to a great deal of progress being made in schools. The State Computer Education Centre has produced a large amount of material for schools. This ranges from tutorials in using different types of programs and general introductions to various aspects of computer

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use in schools to curriculum ideas for using computers. More than 30,000 of these booklets have been produced but the demand from schools is increasing. It's interesting that the demand is moving away from introductory materials towards curriculum support. This is pleasing since it shows that many teachers have mastered the computers and are looking for effective ways to use them in their classes. A new series recently launched, *Social Implications of Technology*, has already proven to be very popular, not only in Victoria but also interstate. The first booklet, *Changing Work Pattern* is soon to be followed by a second on the controversial issue of Privacy.

What Do Schools Use Computers For?

The State Computer Education Centre does not lay down a strict policy on the use of computers in schools, but provides guidelines and material to assist schools to pick effective uses of computers in their curriculum. The general policy is 'Computers Across the Curriculum' but this does not mean that a school is expected to use computers in every subject all the time. Where the computer can assist in learning or teaching and provides a tool for students, then it has a place.

Although the program has been responsible for providing millions of dollars of funding to assist schools to purchase computers, this has only really scratched the surface and a large amount of funding will need to be provided for some years to come if schools are to have enough suitable equipment to fulfill their requirements. Fortunately, many school communities have come to the aid of their schools and raised funds for computers.

Word processing would have to be one of the major uses of computers in schools. It blends in very well with the approach to writing used in primary schools and also finds a ready home in post primary schools for writing development at all levels. Logo is used in many primary schools, mainly for the turtle graphics part of its operation, since it provides a good learning environment for young students.

Some forms of computer assisted instruction are used in schools but this is giving way to the use of simulation software and adventure games. As better software is being developed, teachers utilise it fully and develop the teaching programs around it. Adventure games can sometimes be used as the theme for several

weeks' work. Students don't spend all that much time at the computer since they are busy doing work which the adventure game has spurred them onto.

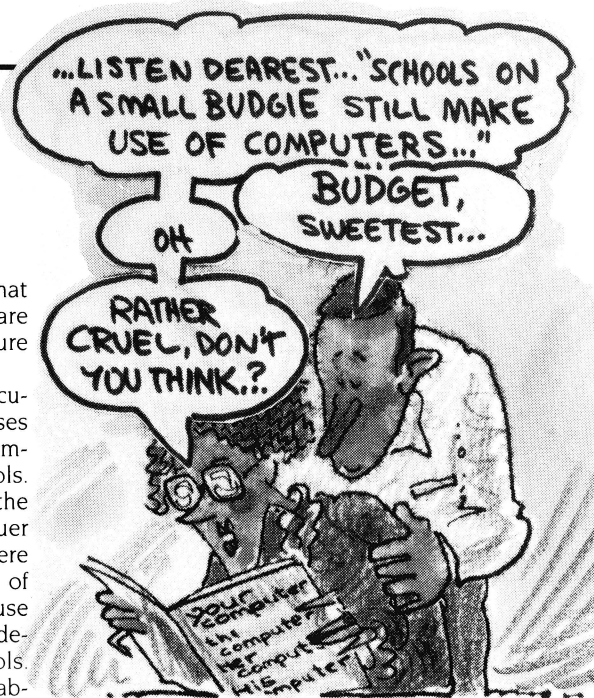
There are a few areas receiving particular attention at the moment. Databases are being developed by the State Computer Education Centre for use in schools. One of these is on shipwrecks along the Victorian Coast and another, Point Puer Database, is about the children who were convicts in Tasmania. The general use of databases is being encouraged because community research is a theme being developed for computer use in schools. Many local databases are being established to cover such diverse topics as the local cemetery to old buildings. With these databases students are using the computer as a tool to assist with their work — the computer itself is not the main area of study.

Communications is becoming a focal point for a wide cross-section of schools. Telecom's generosity allowed many schools in the State to try out telecommunications for themselves without any cost. This has whetted the appetite and they have been anxious to carry on using telecommunications — Stage 2 of the Telememo trial is getting underway and this will involve four major projects which stress the speed and convenience of telecommunications as an information gathering source. This stage is not free, but is being subsidised by the State Computer Education Centre and Telecom. It is expected that 200 schools will take part. Schools also have access to their regional computer centre and all computer consultants through Telememo.

Many other areas of the curriculum are starting to receive attention, these include computers and music, computers and textiles and desktop publishing. As teachers learn what computers can do, they are starting to see relevance in their own subject areas and are developing new ways to extend and enhance their curriculum. The introduction of the newer technology has also meant that many new doors have been opened. For example, the Macintosh is being used by very young students in primary school because it is so easy to use and also by the oldest students in post primary schools because of its power.

What Computers are Recommended?

Currently Apple, BBC, IBM, Microbee and Pulsar have various models on the recom-



mended list. Computers have often been recommended for various purposes and schools are encouraged to purchase recommended models — these are the only ones which receive support from the State Computer Education Centre. There are currently more than 14,000 computers in schools in Victoria and many manufacturers are now becoming aware of the size of this ever-increasing market. Particular computers are recommended after extensive testing for suitability. This occurs about every 18 months, but updates may be issued in between major evaluations to take care of model changes and new equipment.

At present an evaluation of 'Special Purpose' computers is being conducted. This evaluation is looking at computers in the special fields of desktop publishing, music, graphics, CAD/CAM, video and art. Manufacturers and suppliers were asked to tender machines they considered suitable for these purposes and these are currently being examined by teams of experts in each field. A special recommendation will be made to assist schools in selecting computers for these purposes.

Projects of special significance are established and monitored from time to time to help all schools in the State by providing examples of how schools can use computers in particular ways. There are currently a number of these projects operating and materials about their operation should be available in the near future. The State Computer Education Program also offers advice and assistance in the areas of Special Education and Equal Opportunities for schools and teachers seeking help. □

LogoWriter

As Brian Davey and his students at the Hurstbridge Learning Co-operative Primary School were pleased to discover, Logo's famous turtle has found new life and a wordprocessor to boot in this exciting new package.

SOON AFTER LOGO was introduced as a programming language for children, it developed a cult following amongst a small group of teachers. Logo was hailed as a breakthrough in educational computing.

Logo Professor, Seymour Pappert, and his colleagues at the Massachusetts Institute of Technology had been using a list processing language to teach concepts of computing to secondary students.

To provide a more appropriate medium for younger children, Logo was created. In fact, Logo has since been described as list processing with a human face. The human face is provided by a small shape, called a turtle, on the screen. The turtle can be programmed to move around the screen via a number of simple commands such as forward, back, left, right, pu (pen up) and pd (pen down). It carries a pen with it which when down leaves behind a trail.

The programming of the turtle is known as Turtle Graphics. Some implementations of Logo have nothing more. A true Logo has both turtle graphics and the underlying list processing language which may be used in conjunction with or instead of the turtle graphics.

Logo is not just an intricate game, but a programming language and, in the opinion of most educators, is a far better introductory language than Basic.

Apart from being a gentle but powerful introduction to programming, Logo exposes children to the structure of geometry (via Turtle Graphics) and language, through list processing. Unlike many computer languages, number crunching is not a principal focus of Logo. The most powerful contribution of Logo is to thought processes and problem solving.

Like Basic, Logo is interactive — you may enter a single command and see the outcome at once. Unlike Basic, Logo is structured — rather than being a single entity, a Logo program consists of a number of procedures linked together. Once a procedure, for example SQUARE, has been defined it has the same status as any of the original Logo commands and may be used as a command within another procedure.

A Logo procedure may also call itself — at the end of the procedure is a line containing the name of the procedure. This produces a potentially neverending loop. The fact that the inputs to the procedure may be altered when it calls itself makes this feature, known as recursion, most powerful. (Figure 1 contains an annotated Logo program which allows children as young as three or four to create shapes by typing GO and then using single keystrokes. A simple application of list processing allows the children to see their shapes drawn again by pressing the Enter key.)

Unfortunately Logo hasn't fulfilled its original promise. There are still many classrooms where a computer is available but Logo isn't. The problem seems to be that Logo was built from the bottom up by computer experts too far removed from the real-life educators in primary and secondary schools.

As the originators of Logo now admit, an unreasonably high level of programming skills was expected of the classroom teacher. A specific problem was the difficulty encountered in labelling shapes. For example, a student wanted to use turtle graphics to draw a QWERTY keyboard on the screen. For the nine year old, the problem of getting the turtle to draw the variously shaped keys and placing them correctly on the screen was challenging but within her reach. Then, quite reasonably, she wanted to label each of the keys. This turned out to be a problem which was well beyond her.

The solution was to write a procedure which provided the children with a rudimentary screen editor within the turtle graphics mode. While this was an enjoyable, five-hour exercise for a Logophile, it is certainly too much to expect of a busy classroom teacher.

LogoWriter

Now, after nearly five years of development, Logo has been rebuilt from the top down and reborn as LogoWriter, an exciting enhancement of Logo which combines it with a word processor and also has an animation facility via user-definable 'software sprites'. To date, LogoWriter is available on IBM PC and IX, Apple IIe and IIc and the Commodore 64.

The file structure of LogoWriter is built around the idea of a page (a file on the disk) and a scrapbook (a set of LogoWriter pages on one disk).

When LogoWriter is started, a Contents page appears on the screen. This is a menu page that lists the pages in the scrapbook. From the Contents page you may choose a page from the scrapbook, erase pages or choose a blank New Page. A page has two sides: the front side, where text is written and graphics are drawn, and the flip side, where procedures are defined.

Once a page is chosen from the Contents page, its name appears at the top of the screen and its front side is displayed. The flip key (Ctrl-F on an IBM) flips from the front to the back. The bottom four lines on the screen is known as the Command Centre and is not part of the page.

As well as the turtle, there are two cursors on the the screen: one for typing in text on the front side and procedure definitions on the flip side, and another in the Command Centre for typing in LogoWriter instructions.

The active cursor is moved from Command Centre to Page and back via the up and down keys (Ctrl-U and Ctrl-D on an IBM). The text and turtle graphics on the page may be entered and cleared quite independently of each other.

The Escape key (or F1 on the Commodore) is used to leave the page and return to the Contents: text and graphics on the front side and procedure definitions on the flip side of the page are saved automatically.

Programming LogoWriter primitives (for instance, in-built commands) for turtle graphics and list processing, are essentially the same as those in earlier versions of Logo.

Some extra primitives are needed since input and output of lists can now occur both on the Page and in the Command Centre. Primitives are also provided for swapping from one page to another.

One of the exciting features of LogoWriter is the ability to define new procedures for editing the text on the page, thereby enhancing the word processor. For this purpose primitives such as top, bottom, cb, cd, cf, cu (for cursor back, down, forward and up), select, cut, copy, insert, and delete are provided.

Special Features

At any time the Help page may be called up via the help key (F10 on an IBM). The Help page provided on the disk displays the available colours and their numbers and lists some primitives for naming and changing pages, setting the background and turtle colour and the shape of the turtle, and clearing the Page and Command Centre.

The Help page is easily customised since any page named Help will become the Help page.

Included on the disk are four tutorial pages called Learn1 to Learn4. These teach the most commonly used non-alphanumeric keys and the basics of turtle graphics.

Special procedures, called tools, may be defined and loaded manually or automatically (when LogoWriter is started up). They then act like primitives: they do not appear on the flip side of the current page and they remain available even when the page is changed.

Four sample pages of tool procedures for turtle geometry, word processing, text formatting and maths are provided.

Ten keystroke combinations are user definable — Ctrl-N,-O,-P,-Q,-R,-V,-W,-X,-Y or -Z. For example, if Ctrl-Z were defined to be the primitive printscreen, then pressing that key would immediately print all text and graphics visible on the page, even if another program was running.

Turtle Graphics

Four turtles are available. Their shapes, colours and movements may be programmed independently though not in parallel. On an IBM IX and a Commodore all 16 colours are available for the turtle and for the background. While all 16 background colors are available on an IBM PC, there are only 4 turtle colours. The Apple II's 6 colours are available for both turtle and background.

In previous versions of Logo, to move the turtle around the screen without leaving a trail involved a long series of commands and was a source of much frustration, especially for younger children. Students involved in tests have been pleased to discover that after pressing the turtle move key (F9 on an IBM), the turtle could be moved with the arrow keys.

A figure drawn using the turtle could be labelled using the word processor, but then the labelling would be lost if the text were cleared. To overcome this a label primitive and a label key (F8 on an IBM) are provided. When the label key is pressed a new cursor appears on the page. Text put on the page with this cursor remains part of the graphics and is not cleared by a clear text command.

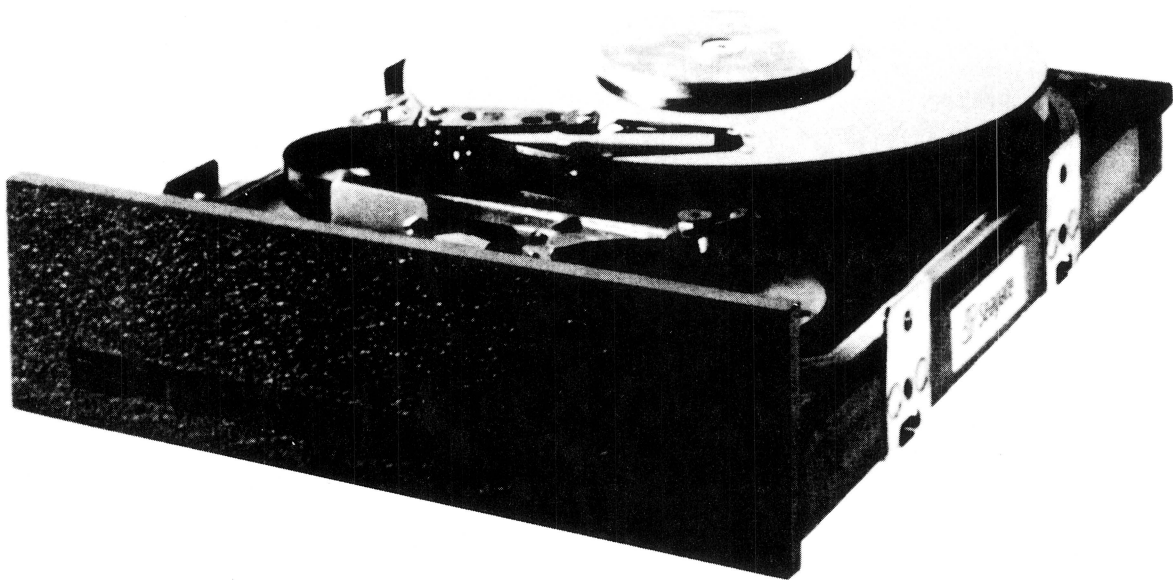
This month's reviews of muMATH, Modula-2, the HP28-C and Sort, were written by AMSEC consultants Glenn Fullford, Michael McCarthy, Geoff Prince and Ian Robinson of La Trobe University's School of Mathematical and Information Sciences. AMSEC is a Melbourne based software evaluation company which has consultants from various tertiary institutions around Australia. The directors, Brian Davey, who wrote the review of LogoWriter, and Sid Morris, are both readers in the Mathematics Department at La Trobe University. AMSEC may be contacted at PO Box 360, World Trade Centre, Victoria 3005.

One criticism of the LogoWriter turtle graphics is that the graphics page is always in wrap mode. This means that when the turtle goes off the page it automatically wraps around and re-enters the page from the opposite side. As a result many beautiful patterns such as spirals cannot be drawn without each side wrapping. ▶

Product Details

Product:	LogoWriter
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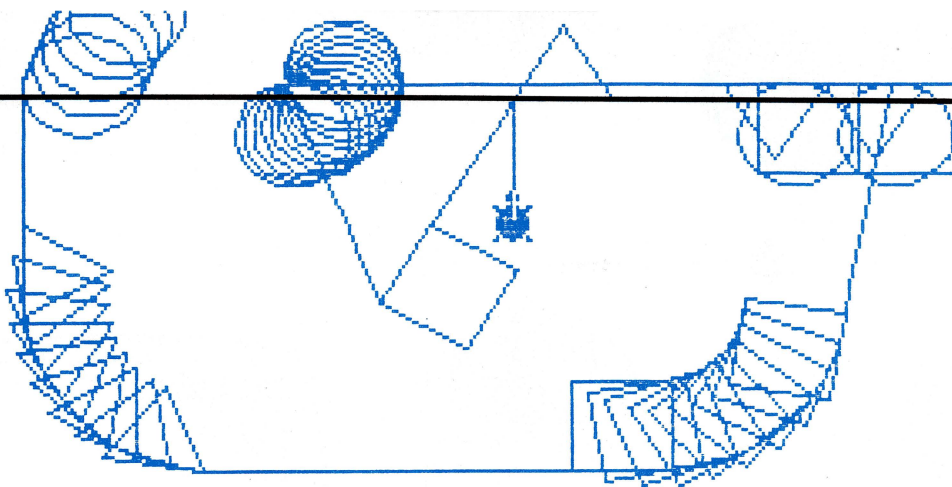
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Most Logos overcome this by including the primitives fence and window. The former stops the turtle as soon as it reaches the edge of the screen while the latter disables the wrap mode and allows the turtle to wander off into the wide blue (or other background colour) yonder. Hopefully future versions of LogoWriter will include these primitives.

Animation

Without doubt this is the feature of LogoWriter which really captured my students' imaginations. The disk contains a Shapes page on which there are 20 ready-made shapes which may be modified along with room for 10 user-defined shapes. Each shape is a 16 x 16 matrix of dots. The turtle's shape can be set to any of these shapes. By combining this facility with the tone and wait primitives it is not too difficult to have a person dance around the screen to your favourite tune.

Word Processing Text is entered on the page in 40-column mode. Wordwrap is automatic. On an IBM, 19 lines of the text on the page are visible on the screen. Cursor control is provided as usual by carriage return, space bar and the arrow keys as well as special or combination keys for top and bottom of page, beginning and end of line, and next and previous screen.

Editing keys are provided for select, cut, copy, paste and erase to end of line. Search and replace are in-built primitives. More sophisticated word processing features such as right-hand justification and centering are not in-built. Nevertheless, since the wordprocessor is programmable, it is possible (and not difficult) to define further editing procedures. For example, nextword and preword procedures are provided on the wordtool page.

To use such commands move down to the command centre and then type in the command. If a procedure such as nextword is to be used often, you could define Control-Z to be nextword so that it is more easily accessed.

```

*** SINGLE KEYSTROKE LOGO ***

to go
  ct cg
  print [What do you want to call your
  shape?]
  make "title (first readlistcc)
  make "keylist []
  ct singlekey
end

to singlekey
  make "key readchar
  interpret :key
  if :key = "q [finish]
  make "keylist (fput :key :keylist)
  singlekey
end

to interpret :key
  if :key = "b [back 10]
  if :key = "f [forward 10]
  if :key = "l [left 10]
  if :key = "r [right 10]
  if :key = "c [circle]
  if :key = "s [square]
  if :key = "t [triangle]
end

to finish
  make :title :keylist
  pu home pd
  print [Press Enter to see your shape
  again.]
  type [ot cg again :] type :title
  stopall
end

to again :keylist
  if empty? :keylist [stop]
  interpret (last :keylist)
  again (butlast :keylist)
end

to circle
  repeat 36 [forward 3 right 10]
end

to square
  repeat 4 [forward 30 right 90]
end

to triangle
  repeat 3 [forward 30 right 120]
end

```

;Clears text and graphics from page.
 ;Prints message at top of page.
 ;The name entered in the command
 ;centre is read as a list. The first
 ;word (i.e. up to the first space)
 ;becomes the value of TITLE. KEYLIST
 ;is initialised as an empty list.
 ;The procedure SINGLEKEY is called.

;The next character read from the
 ;keyboard becomes the value of KEY.
 ;The procedure INTERPRET is called
 ;with the value of KEY as input.
 ;KEYLIST is updated by putting the
 ;value of KEY in front. This is
 ;repeated until a "q" is pressed.

;If the value of KEY is one of the
 ;seven letters shown, then the
 ;turtle carries out the listed
 ;command. Control then returns to
 ;the previous procedure, namely
 ;SINGLEKEY.

;The name previously given to the
 ;shape (i.e. the value of the
 ;variable TITLE) is given the value
 ;of KEYLIST as its value. The turtle
 ;returns to the middle of the screen.
 ;The instruction is printed on the
 ;page. The commands are typed (with
 ;no carriage return) in the command
 ;centre. Once Enter is pressed, the
 ;screen is cleared and AGAIN called
 ;with the value of KEYLIST as input.

;INTERPRET is called with the last
 ;letter in the list of key strokes
 ;as input. The last letter is erased
 ;and the procedure repeated until
 ;the list of key strokes is empty.

;A small 36-sided polygon is a fair
 ;approximation to a circle.

;Draws a square with each side 30
 ;turtle steps long.

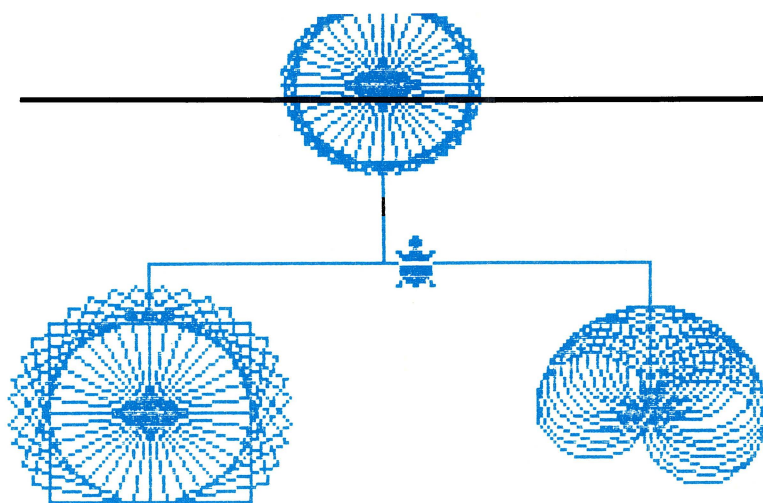
;Draws a triangle with each side
 ;30 turtle steps long.

Figure 1. A LogoWriter program. After typing GO, single keystrokes control the turtle. A simple application of list processing allows the shape to be redrawn by pressing the Enter key.

Printing

The usual screen dump is disabled. The text and graphics visible on the screen may be printed by entering printscreen in the command centre. The printtext command will print all the text on the current side of the page; but, since the screen is in 40-column mode, this utilises, at most, half the width of the paper.

Printing in 80-column mode is available via printtext80. Page breaks are entered automatically when text is printed, but it is not possible to see on the screen where these will be. There are primitives for single and double spacing, but other text enhancement such as bold face or italics which may be available on the printer cannot be accessed. ▶



Logowriter is the first piece of software I have seen which uses the full colour graphics capabilities of the IBM JX — it's worth buying a JX just to be able to use Logo Writer on it!

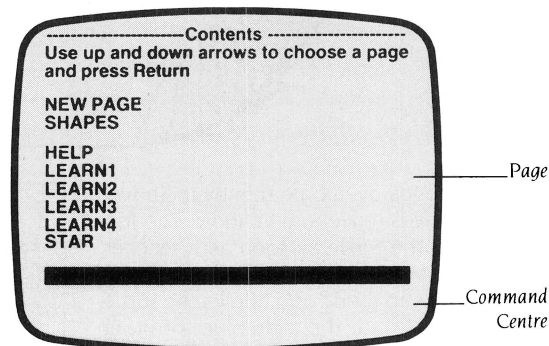


Figure 2. The Contents page is LogoWriter's opening menu. The bottom four lines of the screen are the Command Centre, which is not part of the Page.

If LogoWriter has a weakness it is in its arithmetic. Its only arithmetic reporters are +, -, *, /, =, <, >, cos, random, remainder and sin; though the mathtool page does include procedures for calculating factorial, absolute value, integer part and square root. Four-decimal-place accuracy is fixed, which yields $1/3 = 0.3333$ and more disturbingly $(1/3) * 3 = 0.9999$. Input of a five-decimal-place number such as 0.12345 is greeted with an error message.

Documentation

Overall the documentation is very good. The full LogoWriter pack includes a Reference Guide, Keyboard Stickers and Posters, and, most importantly, six excellent Project Booklets with almost 100 follow up Activity Cards, all backed up by a detailed Teacher's Manual.

The Project Booklets are graduated so that full details are given in the early booklets with more being left to the user in the later ones. Described in the booklets are 16 projects covering language arts, word processing, communication arts, animation, social studies and mathematics. The projects are designed to use the unique features of LogoWriter.

In the month that I had LogoWriter, my students tackled seven of them. Along the way, they found a few minor bugs in the projects; but, in the spirit of Logo, gained confidence from the debugging process.

The Reference Guide is clear and concise with hardware differences well explained and examples and cross-references provided for each LogoWriter primi-

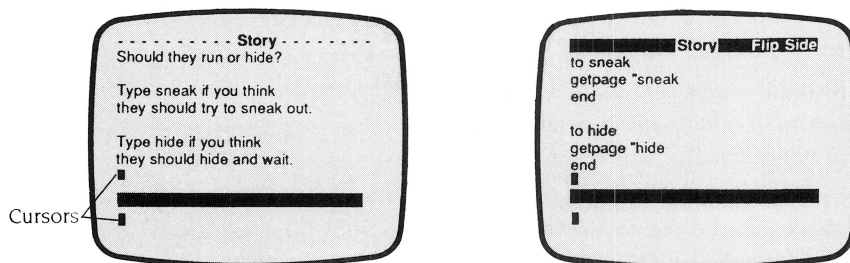


Figure 3. The 'flip key' (Ctrl-F on an IBM) flips the page from the front to the back. Note the two cursors — the top one is used for entering text on the front side and procedure definitions on the back. The bottom cursor is used for entering Logo instructions.

tive. There were a few important pieces of information that I was unable to find in the Reference Guide such as the length of, and allowable characters in, a pagename. In fact, a pagename may be any allowable filename without an extension. Also, it took experimentation to discover that the x co-ordinates of the turtle graphics screen can vary between -160 and 160 degrees, and the y co-ordinates between -95 and 95; I was unable to find this stated in the guide.

As in other versions of Logo, a special role is played by the backslash. Used as a prefix, it allows characters which are not normally permitted within a word, such as '-' and the delimiters for words and lists, namely ' ' and ' ', to be treated literally. This fact is hidden away on the last page of the Reference Guide.

A novel idea from the publisher's the Site Licence Pack which, along with the documentation, contains disks for all four computer versions and unlimited software copying rights for the school building.

A Home Licence Extension allows students attending a site-licensed school to copy the software for home use. Purchasers of a site licence also receive a bi-

monthly newsletter, a discount on software, and documentation updates.

While site-licensing of software at tertiary institutions is quite common, the concept is new in primary and secondary schools. This aspect of LogoWriter may set a new standard for the marketing of high quality software at these levels.

The overall assessment of LogoWriter is that it is five-star material. It is well conceived, executed, educationally relevant and fun to use. The ability to use LogoWriter on an Apple at school and then have an IBM version to use at home is an important innovation. Logowriter is the first piece of software I have seen which uses the full colour graphics capabilities of the IBM JX — it's worth buying a JX just to be able to use LogoWriter on it!

Some schools may balk at the price. They shouldn't! LogoWriter is value for money. If your child's school, be it primary or secondary, doesn't yet have LogoWriter, make sure they get it. And if necessary sell laminations to raise the extra \$199 for the Home Licence Extension — you won't regret it. □

EARTH

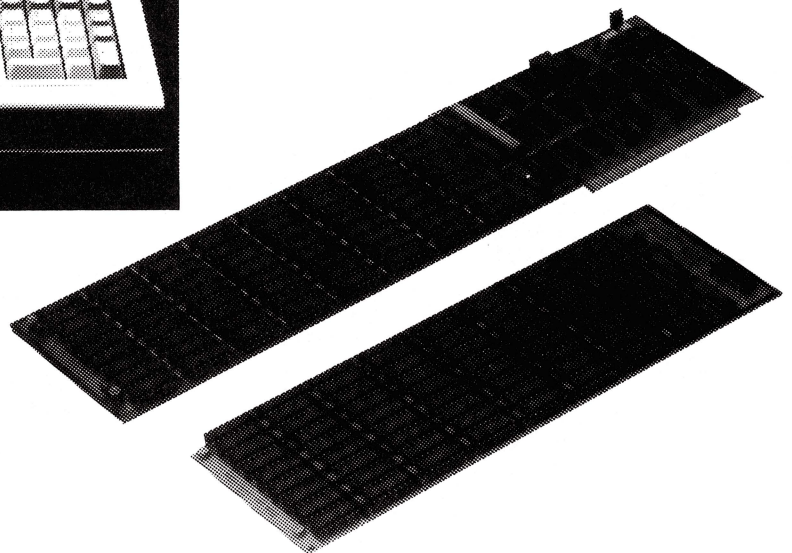
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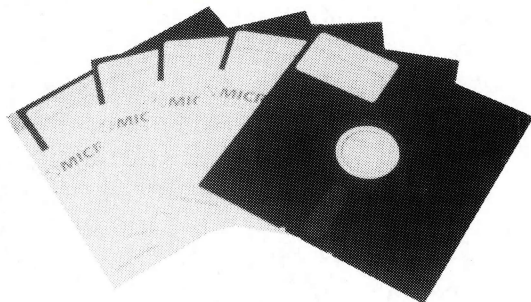
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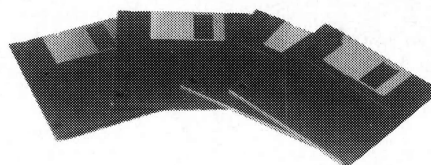
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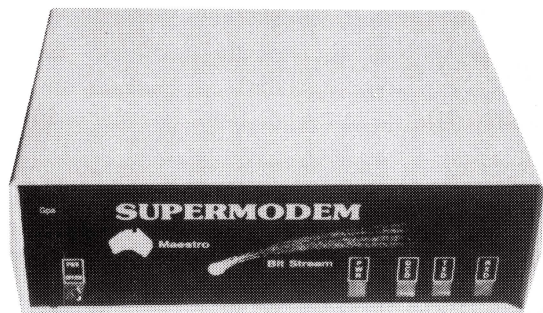
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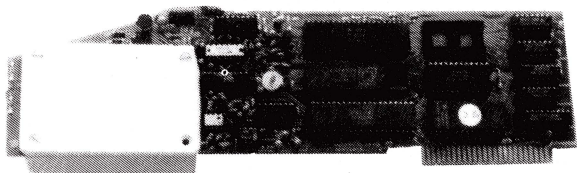


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Modula-2

There has been intense competition to develop a programming language that builds on the successful features of Pascal, and remedies its shortcomings. Here Michael McCarthy reviews one of the main contenders . . .

IF YOU'RE LOOKING for a 'structured' programming language with the power and flexibility of C, but with a high-level syntax like (an extended) Pascal, then Modula-2 could be what you are looking for. If you already know some Pascal, then you have a distinct advantage, while if you don't, Modula-2 can represent a way of learning two languages for the price of one.

Considered by many leading computer scientists to be the natural successor to Pascal, Modula-2 is rapidly gathering momentum, now that compilers are available for most popular machines.

Background

In 1977 Professor Niklaus Wirth, the creator of Pascal, published details of Modula, a high-level language designed for programming a computer to perform concurrent real-time tasks, such as monitoring or controlling a number of devices 'simultaneously' in scientific laboratories. The following year he completed specifications for Modula-2, which can be thought of as, essentially, an extension of both Modula and Pascal.

Originally Modula-2 was conceived as a systems programming language, for writing device drivers, operating systems,

compilers and other software previously considered the domain of much lower level languages.

By 1981, in accordance with Wirth's philosophy that 'a computer's design must not start with the specification of its . . . architecture, but rather with the definition of the programming language', his research group at the Swiss Federal Institute of Technology (ETH) in Zurich had produced working models of the Lilith, a microcomputer whose operating system and utilities were programmed entirely in Modula-2.

Lately, however, Modula-2 has been gaining popularity as a general purpose programming language, and today versions exist for the Macintosh, Amiga, Atari ST, IBM compatibles, Apple II and many Z-80 based micros, as well as a wide range of minicomputers.

Naturally, the popularity of a programming language depends largely on the availability of good, low-cost compilers, but there is also a growing recognition of the need for more structured approaches for dealing with the increasingly complex tasks confronting the microcomputer programmer.

Structure and Programming Languages

What is meant by the word 'structure' of course depends entirely on the given context, and in relation to a programming language, generally refers to the degree to which it possesses —

- 1) structured data types,
- 2) a well defined form shared by all programs written in the language,
- 3) facilities for structured program design (for example, provision for separate compilation of program units, hiding of data objects, and so on).

With 1) and 2), most microcomputer versions of Basic have much less structure than Pascal. For instance, the only structured data objects handled by the former are strings and arrays, whereas Pascal is equipped with arrays, sets, and records, not to mention a much richer collection of elementary types.

A Worthy Successor to Pascal

Furthermore all Pascal programs share a format or 'block structure' that can be completely defined by simple syntax diagrams or Backus-Naur charts. For example, they all begin with the keyword 'program', and must have any constant, type, variable, or procedure declarations appearing, in that order, before the main body of the program.

A computer's design must not start with the specification of its . . . architecture, but rather with the definition of the programming language

On the other hand, most Basics are free-form languages, permitting the use of symbols without any prior warning or declaration, and with very few structural elements shared by all programs.

Although the choice of a programming language is not so important for small one-off tasks, when designing large software projects where long-term use, portability, and ease of maintenance must be taken into account, it becomes much more critical. In such cases, structure in the sense of 2) provides for greater readability, and may allow the detection of many errors (for instance misspelt variable names) at compile time, thus avoiding run-time errors that can be difficult and time-consuming to trace.

Also, the ability to break programs up into units or modules for separate compilation, testing, and debugging, means that large tasks can be divided amongst a team of programmers. This increases the likelihood that any low-level, machine dependent components can be isolated, and thus easily changed, if portability is required.

The Modular Solution

It is in this last area, that Pascal has received criticism, for although some versions do provide 'macro' commands for including separate source files in programs, or allow separate compilation of external procedures, these facilities are not part of the standard language specification. For that reason they are not very portable.

There are still major problems regarding the visibility and scope of variables; in particular, there is no elegant way to allow such an external group of routines shared access to data objects, or to maintain the values of (non-global) parameters across procedure calls.

The way in which Modula-2 gets around all these difficulties is via modules. Essentially, there are library modules and program modules; the main idea is that a library module should store a group of objects (subroutines, variables, constants), and that program modules should be able to 'import' or gain access to any of these objects via an 'import list' placed at the beginning of the program.

Similarly, a library module can import objects from other library modules, as well as 'export', or make visible externally, any of its own objects. Conversely, any objects not explicitly exported by a module will remain 'invisible' outside the module, thus eliminating undesirable side-effects and name conflicts.

As a further aid to structured programming, each library module is physically separated into a definition file and an implementation file which for simplicity are called modules. The definition module contains the list of exported objects, their formal declarations, and usually any necessary documentation.

The implementation module contains the actual source code for the routines, any internally used objects (constants, variables and so on), together with an optional section of code that is automatically executed at the start of any program that imports anything from the module.

As an illustration, consider the example in Listing 1 of a library module. Note that Modula-2 is case-sensitive (* and that comments are embedded like this *).

As you can see, the definition module provides a concise, readable summary of the facilities provided by the module. The only visible objects are those that any programmer wishing to use the facilities needs to know about, such as the names of the exported subroutines (the procedures), and the details of their parameter lists.

The corresponding implementation module, however, serves to hide irrelevant, and sometimes unpleasant, programming details from the user, and may contain other objects with a purely internal scope, as illustrated in Listing 2.

Product Details

Product:	Modula-2
From:	Modula Corporation, Provo, Utah
Distributed by	JED Microprocessors 7/5 Chandler St. Boronia Vic. 3188 (03) 762 3588
Price:	\$100 MS-DOS and CP/M systems (FTL Modula-2) (\$400 to \$500 for commercial development systems) \$200 Amiga version \$300 Atari ST version \$600 Macintosh version

There are two key features to note — First, before any program that imports from MoreMath begins executing its own code, the variable 'seed' will be assigned an initial value. The main point here is not the (perhaps questionable) way in which this occurs, but that implementation modules can have a body of executable code just like programs.

The second feature to note is that 'Seed' retains its last assigned value in between calls to the procedure 'Random', and yet, like 'incr' and 'divisor', remains effectively invisible outside the module. This illustrates the deeper meaning of 'visibility', and means that programs and other modules are also free to use these names without fear of conflict, even if they import objects from MoreMath.

As a short illustration of this last point, consider the program in listing 3, to print a list of random numbers to the screen.

The variable 'seed' in the above program serves simply as a counter, and causes no interference with the variable of the same name used internally by MoreMath.

Definition modules must always be compiled before their corresponding implementation modules, and indeed can be used before the latter have even been written! For example, if the above definition module (stored in a file called, say, MOREMATH.DEF) were compiled, a symbol file called MOREMATH.SYM would be produced as output. It would then be possible to write *and compile* the program Rand, regardless of whether or not the implementation module for MoreMath existed.

Of course, the program couldn't actually be run until an implementation of MoreMath had been compiled, and the program linked to resolve any symbolic references to MoreMath's objects. Nevertheless, the programmer could proceed as if all the routines were actually there in a library, and the compiler used to check the syntax of programs.

A further benefit of this separation of definition and implementation relates to the changes that are forced in a module hierarchy when the code of a 'low-level' implementation module has to be altered. For example, suppose a module X imports from Y, which in turn imports from Z, and that a bug is found in the (implementation) module Z. It is only necessary to fix

the bug, and then recompile Z — that is, it isn't necessary to recompile X and Y. (If X is a program module, however, it will be necessary to relink it.)

In this way, Modula-2 also permits such seemingly implausible constructions as two modules that both import objects from each other!

```
DEFINITION MODULE MoreMath;

EXPORT Complex, pi, halfPi, MMres, Random, Cadd, Cmult, Arcsin
;

TYPE Complex = RECORD real, imag : REAL END;

CONST pi = 3.14159266; halfPi = pi/2.0 ;

VAR MMres : BOOLEAN; (* returns status of last procedure call *)

PROCEDURE Random () : INTEGER ; (* pseudo-random no. generator
*) PROCEDURE Arcsin ( x : REAL ) : REAL; (* inverse of sine
function *) (* addition and multiplication of complex numbers *)
PROCEDURE Cadd( c1, c2 : Complex ; VAR res : Complex) ;
PROCEDURE Cmult( c1, c2 : Complex ; VAR res : Complex) ;

END MoreMath.
```

Listing 1. A library module in Modula-2 is used to provide a concise, readable summary of the facilities provided by the module, in this case, MoreMath. Note that Modula-2 is case sensitive and comments are embedded with (* ... *).

```
IMPLEMENTATION MODULE MoreMath;
(* need some procedures and types from 'standard' library
modules *)

FROM MathLib0 IMPORT Arctan, Sqrt; (* used in Arcsin *) FROM
TimeDate IMPORT Time, GetTime; (* to get a 'random' seed *)

CONST incr = 1221 ; divisor = 3443; VAR seed : INTEGER;

PROCEDURE Random() : INTEGER ; BEGIN seed := (seed + incr) MOD
divisor; RETURN seed; END Random;

(*****) (* code for other procedures *)
(*****)

VAR time : Time ; (* record with INTEGER field 'millisec' *)

BEGIN (* module initialization *) GetTime(time); seed :=
time.millisec ; END MoreMath.
```

Listing 2. The implementation module (this one corresponds with the library module in Listing 1) hides irrelevant programming details, and, as in this example, may also contain other objects with a purely internal scope.

```
MODULE Rand; (* this line identifies the file as a program module
*) FROM MoreMath IMPORT Random; FROM InOut (* standard I/O
module *) IMPORT WriteInt, WriteString, WriteLn;

VAR seed : INTEGER; (* this has nothing to do with MoreMath's
seed *)

BEGIN WriteString('Test of random number generator'); WriteLn;
FOR seed := 1 TO 1000 DO (* output random no. in 10 character
field, right justified *) WriteInt( Random() , 10); WriteLn;
END ; (* of FOR loop *)

END Rand.
```

Listing 3. A program in Modula-2 to print a list of random numbers on the screen — the variable 'seed' simply serves as a counter, and causes no interference with a variable of the same name in the implementation module (see Listing 2).

Modula-2

Data Types

Now, some familiarity with Pascal is assumed, since the quickest way to understand the data types of Modula-2 is by comparison to those of Pascal.

Modula-2 has the standard types REAL, INTEGER, CHAR, BOOLEAN, CARDINAL (unsigned integers), as well as the types WORD and ADDRESS, used to store values of one machine word in length, and machine addresses, respectively. Some arithmetic operations and relations can be applied to variables of type ADDRESS, though to some extent this depends on the implementation.

There is also a standard type called BITSET, used to represent sets of integers in the range 0 to N-1, where N is usually the number of bits in a machine word. The usual set operations and relations provide very fast and efficient means of manipulating and testing bits in variables of this type.

Arrays, pointers, and enumerated and subrange types can be used exactly as in Pascal, with minor differences in declarations. For example, pointer types are now declared as in —

```
TYPE realPtr = POINTER TO REAL
```

There is also provision for the construction of sets, although these are generally restricted in size to the number of bits in a machine word. Records too, are much the same as in Pascal (see example, the defined type 'Complex' above), although they can now have any number of variant fields.

One major addition concerns the provision for the definition of arbitrary procedure types, as in the following —

```
TYPE RtoR = PROCEDURE ( REAL ) : Real;  
VAR f : RtoR;
```

Procedure variables can be assigned values such as $f := \log$, passed to other procedures as parameters, and stored in records and arrays just like variables of any other data type. Note that there are no 'Functions' in Modula-2; instead, procedures may or may not return values, though as in Pascal, these must be of unstructured type.

A related issue, which represents a major improvement over Pascal, is that procedures can be declared with 'open array' parameters. Thus 'Procedure Assign (source : ARRAY OF CHAR ; VAR dest : ARRAY OF CHAR) declares that 'Assign' can accept parameters consisting of character arrays of any declared size.

Further type flexibility is provided by WORD and ADDRESS. A variable or value of any type the same size as WORD (INTEGER, CARDINAL, and usually REAL and BITSET) can be passed to a procedure in place of an expected WORD parameter. In the same way, all pointer types are compatible with ADDRESS, and all arrays are compatible with ARRAY OF WORD.

**Modula-2 also permits
such seemingly
implausible constructions
as two modules that both
import objects from each
other!**

Although these are generally the only ways in which the strong typing of parameters is automatically relaxed, Modula-2 provides type transfer functions that allow one to 'coerce' the value of one parameter into a variable of a different type, provided both occupy the same amount of storage. The general format —

```
c := TypeIdentifier(i)
```

where c is a variable of type specified by 'TypeIdentifier', and i is a parameter the same size as c . For example, this is always the case if c and i are of type CARDINAL and INTEGER respectively, in which case $c := \text{CARDINAL}(i)$ is a valid assignment.

Another important low-level feature is that memory can be addressed directly, as in the declaration —

```
VAR flags [0C00H] : BITSET
```

which specifies that the storage area for the variable 'flags' begins at the absolute address 0C00H.

The final major addition we can mention is the provision of a new type called PROCESS. This, together with procedures exported from standard modules, allows the launching and synchronization of so-called concurrent processes, or co-routines. This greatly simplifies the handling of a number of procedures when you require that; to the user, they should appear to be executing simultaneously.

Additional Low-level Features

Although Modula-2, due to its 'extendability' as a language, has fewer built-in procedures than Pascal, there are a number of low-level functions that are useful

for dealing with some of the data types mentioned above —

HIGH(a) returns the high index bound of array a ,

INC(x), **DEC(x)** increment (resp. decrement) an INTEGER, CARDINAL, ADDRESS, or enumerated type variable x by 1 unit,

INC(x,n), **DEC(x,n)** as above, but by n units,

ADR(x) returns the ADDRESS of the variable x (any type),

SIZE(x) returns number of units of storage occupied by the variable x ,

TSIZE(T) number of units of storage occupied by variable of type T .

It should be noted that with the Addresses and Storage, the word 'unit' means either byte or word, depending on the implementation.

Program Control

Modula-2 has all of the control structures of Pascal, including IF...THEN and CASE statements, REPEAT, WHILE and FOR loops, with the following additions.

1) A LOOP...END construct, within which an Exit statement forces an immediate jump to the first statement following the loop END. This is most useful when multiple exit points are needed.

2) The RETURN statement can be used to force an unconditional return from any procedure, regardless of whether or not it returns a value.

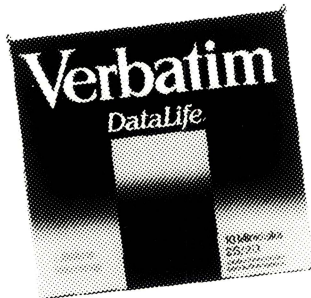
3) For nesting of IF...THEN statements, ELSIF, as well as the usual ELSE clauses,

4) CASE statements can now contain an ELSE clause.

It is important to note that we have only considered standard features. Different implementations come equipped with different collections of library modules, and may vary significantly in their handling of low-level types and procedures.

And of course they will all differ in their 'user interface', in their approach to the program development cycle, and price.

In the coming months we hope to be able to bring you more information regarding availability, as well as reviews, of specific compilers. This will allow a more detailed appreciation of the suitability of Modula-2, not only for mathematical programming, but for handling the complex data structures used in general microcomputing today. □



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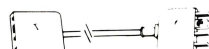
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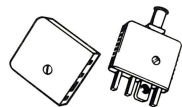
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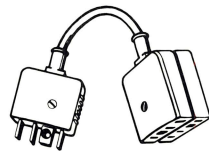
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 T.D. Transmit Data
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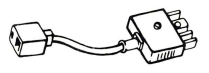
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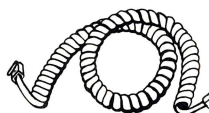
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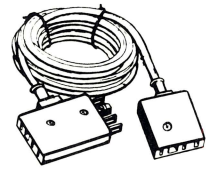
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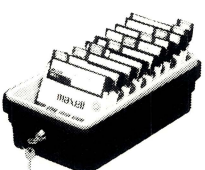
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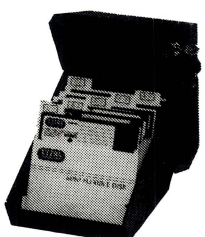
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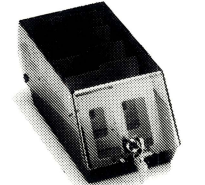
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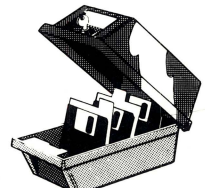
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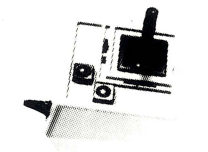
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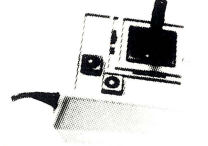
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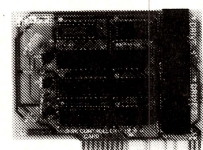
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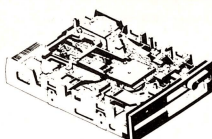
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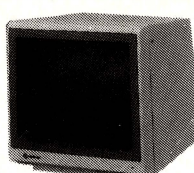


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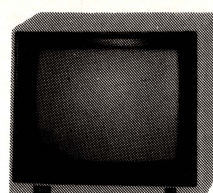
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Vertical: 50 Hz ± 0.5%

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SAKATA 13" RGB COLOUR MONITOR

High quality IBM* compatible monitors, great with VCR's too!

SPECIFICATIONS:
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Video Signal: Separate video signal

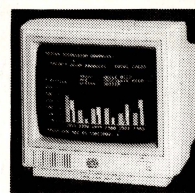
Video: Positive
Sync: Positive
Input Level: TTL Level

Scanning Frequency:
Horizontal: 15.7KHz
Vertical: 60Hz

Display Size: 245(H) x 182(V)mm

Resolution:
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Vertical: 200 lines

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Display Format: 80 x 25 characters

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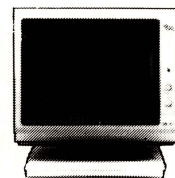
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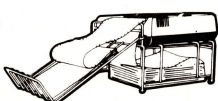
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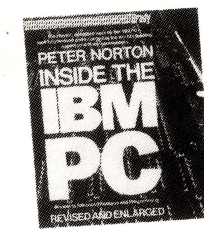
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(Revised and expanded edition)

-Peter Norton

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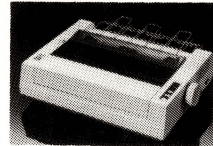
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-Robert C. Brenner

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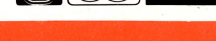
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The HP-28C

A few years ago the battle between hand calculators and micros seemed all over bar the shouting. But the hand calculator is fighting back, as Geoff Prince reports.

IN THE EARLY 1980s, it seemed that scientific calculators had had their day, at least as far as innovation was concerned, and that microcomputers were having their run. In 1983 the market changed when hand held calculators like the HP-15C came on the market with hard-wired facilities which had previously only been programmable.

Hewlett-Packard have recently released a new hand held calculator, the HP-28C, which marks the 15C as the last held line. The hard-wired capabilities of the 28C are very extensive and make it a handy, yet powerful tool for the office or university.

How innovative is this machine? Very! It differs from previous HP models by being menu driven, which releases it from the restriction of being limited to three functions per key (at most). Indeed, the 28C has only one shift key as opposed to two on the 15C!

The four line display allows graphics to be used for the first time to assist in matrix calculations, equation solving, and graph plotting.

Reverse Polish Notation (RPN) is still used but the stack is now 'dynamic', that is, of variable size, and can be partially displayed. The algebraic notation of con-



Figure 1. The HP-28C Calculator has 250 programmable functions and 60 direct commands — and no cable is needed for the optional printer: the connection is via an infrared beam that allows the printer to be about half a meter away.

41

muMath — Computer

Computer algebra is used by mathematicians and scientists to manipulate equations, rather than numbers. Glenn Fulford describes muMath, the first computer Algebra implementation on a microcomputer.

MUMATH IS AN algebra package which has been around since 1980, (the latest version being muMath-83), yet is still relatively unknown in the scientific and educational fraternities. This is surprising since it represents a major breakthrough for personal computing in these areas.

The muMath package is, basically, an algebraic manipulation language which allows you to perform calculations with formulae and symbols rather than just with numbers.

For most people who have experienced (or still experience), frustration when carrying out a messy algebraic calculation on some formulae, the anxiety is increased when you discover that you have misplaced a minus sign or made some other trivial algebraic slip.

The best part of muMath is that it takes the pain out of formula manipulation while providing an educational outlet for teachers and students using personal computers.

ol'math

It is part of an overall computer algebra package that was originally developed for CP/M machines. Designed to run on computers with limited memory, it therefore has no trouble running on IBM compatible machines. It will run with as little as 64K of memory, with full effectiveness being obtained with 256K of memory.

The package also comes with muSimp — a Lisp like language in which muMath is written. This article focuses attention only on muMath (or what the manual calls Calculator Mode).

Conventional number crunching program languages (for example Basic, Fortran, Pascal) and spreadsheets, all suffer from the limitation of roundoff error. This is a result of having to represent a real number as a floating point number with a fixed wordlength. This means that only a limited number of significant digits may be retained.

Numerical analysts can point out a multitude of cases where these small roundoff errors can reinforce each other in a complex calculation so that the overall roundoff error is catastrophic.

What distinguishes muMath, from these other languages, is that it represents numbers as lists so we have variable precision, depending on need. For example the fraction 257/896 is stored with the numerator and denominator in their simplest form rather than the decimal approximation.

A simple example of exact arithmetic using muMath is the calculation $1/3 + 2/3$. While muMath returns the answer 1, many number crunching languages will give an approximate answer like 0.999999.

The fact that muMath stores its entities as lists of strings, allows it to do a great deal more than just exact arithmetic with numerical constants. Its power arises from the ability to manipulate quantities which have not previously been assigned a value (unknown variables x, y). For example, muMath calculates the expression $1/x + 2/y$ as $(y + 2x)/(xy)$.

The ability to work with expressions comprised of unknown values means that muMath is suitable for any algebraic manipulation which is algorithmic in nature. A straightforward illustration of this idea is to get muMath to solve a simple quadratic equation for which there is a standard formula for the roots. This is done by calling muMath's built-in function SOLVE as follows —

```
SOLVE (X^2 + 2Y*X + 4 == 0, X);
```

The arguments of the function SOLVE are the whole of the equation and the vari-

able for which you wish to solve. A semicolon is required by muMath to terminate an expression (which is allowed to be more than one line long). The response from muMath for both solutions is written as —

```
{X == -Y + (-16 + 4 Y^2)^(1/2)/2  
X == -Y - (-16 + 4 Y^2)^(1/2)/2}
```

where ^ stands for exponentiation.

The simplest way to use the muMath is in Calculator (interactive) mode. Programming your own algorithms needs to be done using muSimp. However muMath comes equipped with quite a large variety of built-in operations as the following examples illustrate —

```
1) DIF (X*SIN(X)*COS(X), X, 2);
```

performs two differentiations of the expression which is the first argument of DIF with respect to x and produces —

```
-4X COS X SIN X +  
2(COS X)^2 - 2(SIN X)^2.
```

```
2) INT (X^2*SIN(X), X);
```

finds the antiderivative of the first expression as —

```
2X SIN X - X^2 COS X + 2 COS X.
```

```
3) {[1,2], [0,3]}^-1;
```

produces the exact inverse of the matrix whose rows are the entries in the square brackets. This inverse is displayed in the form —

```
{[1, -2/3], [0, 1/3]}.
```

Some of the other built-in functions of muMath include routines for calculating Taylor polynomials, solving differential equations, and for vector calculus computations in either standard cartesian co-ordinates or in user defined co-ordinate systems.

The section of the manual describing muMath is clear, concise and well organised. The large number of illustrative examples quickly enables the user to come to grips with the basics.

To become more expert, in order to ensure that muMath simplifies expressions

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muMath

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MS-DOS, CP/M, and
Apple II systems with the Z80 Softcard

algebra on a PC

exactly the way you want them simplified, requires more experience and a very careful reading of the manual.

Also included with the muMath package is a set of four interactive tutorials which cover The Basics of Algebraic manipulation, Factorials and Fractional Powers, Polynomial Expansion and Factoring, Continued Fractions and Exponent Simplification. These are designed for people whose mathematics skills are limited to basic arithmetic.

Anyone who uses a more sophisticated computer algebra package which runs on a mainframe computer (Reduce or Maxima) will, of course, find that muMath has some major limitations.

The simplification processes of muMath are not as advanced and the input/output interface is inferior. Although muMath will refer automatically only to the previous line, the mainframe system lets you refer to any line interactively (this is useful for breaking up particularly complicated calculations).

However, muMath does however allow you to label intentionally any previous line and refer to the line by name at a later date, but this is not in the spirit of true interactive computer algebra.

Because of the substantial demands of computer resources that most mainframe computer algebra programs require, you will be impressed with what muMath can achieve on a personal computer.

Educating muMath

Some exciting prospects in mathematics education are arising, now that computer algebra is becoming more accessible. The same is also true in the technical subjects which use mathematics. Potentially, schools should be able to teach more realistic applications of mathematics as they do not have to be discouraged if the algebra is too extensive.

Furthermore, computer algebra should allow teachers to put more emphasis on fundamental concepts, since less time would have to be spent teaching a multitude of tricks needed for specialised problems. However, it is the future development of packages such as muMath which holds great interest for the direction of teaching in the mathematical sciences.

Presently, the muMath package does not come with any graphics, although there is scope to interface your own graphics package by passing the function to be plotted (created within muMath) to the graphics package.

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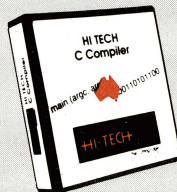
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This has already been done by a group of mathematicians at the University of Hawaii for use in their own teaching program (although it is not yet commercially available).

A design feature to look into would be to create a program that not only gives the answer when a calculation is required, but also a description of the method used to obtain it. This might be particularly useful in teaching of techniques of integration or solving differential equations, since the way muMath 'works out' the answer is exactly the way you wish to teach a student how to do it; that is, first recognition of a standard form then the application of an algorithm. Although muMath was de-

signed with engineers in mind, it can be used by secondary and tertiary students from year 11 onwards.

The muMath package has opened up the area of computer algebra, making it possible to start looking seriously at how computer algebra might revolutionise both the practice and teaching of mathematics.

We will have to wait for developments which will lead to more sophisticated computer algebra packages becoming available on microcomputers and systems like muMath available on hand held calculators. □

Sorting Made Simple

If you're looking for a good Sort, at a reasonable price, then, as Ian Robinson reports, this Basic package may be just the one.

DO YOU HAVE a need for programs which sort your data into alphabetic or numeric order? If the answer is 'yes', then this diskette is the one for you. No need to develop your own code and wonder if there's a better way. For only \$US29.95, you can treat yourself to a well-presented tutorial covering the simplest methods for sorting data which is stored in memory (INSERTION sort and SELECTION sort), more sophisticated methods (SHELLSORT and QUICKSORT), and a simple method which is applicable for external sorting of large amounts of data stored on disk (MERGESORT). Explanations and demonstrations of all these methods are provided, as well as Basic programs for their execution. And just in case you're not familiar with external file I/O in Basic, there's a bit on that too.

Apart from being of considerable importance in many applications, sorting algorithms have also fascinated researchers in computer science for the past 25 to 30 years. It is a fact that there is no one method which is *best* for all initial orderings of the data to be sorted. Most frequently, QUICKSORT is the best method to use for sorting data which is in some sense randomly distributed. Yet idiosyncratically, it is the worst method when the data is already sorted or almost in sorted order! In the tutorial, several comments are made about the merits of each method covered and some suggestions are made about which method to use in certain circumstances. There are no formal analyses of the performance of the methods and little justification of the given recommendations. Nevertheless, the diskette has been adopted to introduce the various methods to first-year mathematics

and computer science students at La Trobe University, who are enrolled in a course on algorithm analysis.

The diskette is very easy to use. You simply load and run it as a Basic program and follow the clearly laid out menus. At the highest level, you can learn how best to use the tutorial and what the function keys do. The purpose of the function keys is also displayed at the base of the screen throughout the tutorial, so you don't have to commit them to memory. There are nine separate lessons, each containing an explanation of the sorting technique being covered, plus at least one interactive program allowing you to observe the technique in action. Each lesson assumes knowledge of the previous ones. (In fact, at the end of a lesson, control passes normally to the next lesson, rather than back to the menu. General material on sorting is contained in the first lesson under the heading Insertion Sort).

Cursors, reverse screen images, and different 'beep' tones are intelligently used in the demonstrations to help the user fol-

low the movement of data during the progress of the sorting algorithm. The Basic programs are also made available for you to adapt to your own needs. If you quit the tutorial part way through, there is a bookmark facility enabling you to restart at the point you quit when you next run the diskette. Keeping in mind that my reaction to this tutorial introduction to sorting is generally very favourable, I do have some criticisms of certain aspects of it, and comments about others.

Unfortunately, the quality of the Basic programs themselves is poor. Certainly, they are effective in sorting items according to the stated technique, but there is little use made of modern programming practices. Unnecessary GOTOs abound, program documentation is almost non-existent, there are several inefficiencies in the code, and even one case where the wrong control structure has been used ('selection' instead of 'sequence' in the tail-copying stage of MERGESORT). It is a pity that a tutorial which has novice programmers as a significant part of its intended audience reflects an outdated approach to programming.

The descriptions of the techniques are accurate, but often overly succinct. For SHELLSORT and QUICKSORT in particular, interspersing English description with examples of completed stages of the methods would be far more instructive than simply giving a full description followed by the full demonstration. In fact,

```

                                SORTDATA
714 682 482 998 646 133 369 587 135 934 220 309 233 894 584 461   4 825  27 374
506 549 114 361 820 872 414 710   1 600 478 766  97 544 879 822 179 527 177 195
317 369 922 193 575 859 694 126   6 826  42 323 664  79 544  88 635 423 745 730
968 686 212 561 718 661 523 896 963 179 218  41 763  47 872 326 171  69 52  52
259  72 315 521  77 850 210  64 702 228 325 987 191  18 203 593 604  34 414 220
   2  85 518 147 451 978  81 707  19 532 665 214 753 558 833 968 739 878 133 289
 10 288 151 495 652 614 440 886 730 659 551 791 279 234  65 502 390 155 534 340
106 252 526 625 511 313 599 665 643 150

                                SORTWORK.3
 4  27 133 135 220 233 309 369 374 461 482 584 587 646 682 714 825 894 934 998
 6  42  79  88 126 193 317 323 369 423 544 575 635 664 694 730 745 826 859 922

                                SORTWORK.4
 1  97 114 177 179 195 361 414 478 506 527 544 549 600 710 766 820 822 872 879

Reading a block of size 20 or less into main memory for sorting
Sorting them in main memory by the SHELLSORT METHOD.
Writing the block out to SORTWORK.3
Press F8 to EXIT. Enter number from 1 to 9 to change speeds, 0 to pause
```

Figure 1. The demonstrations of the external methods given on the diskette are excellent — they provide clear statements before and after the completion of each stage of the sorting process.



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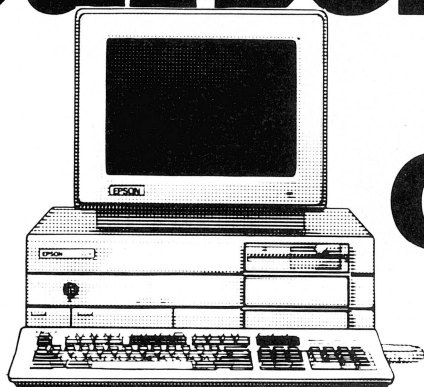
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some users may experience difficulties understanding these methods straight off. The demonstrations of the external methods are excellent because they do provide clear statements before and after the completion of each stage of the sorting process.

There are some minor inconsistencies of presentation. For instance, allowing the user to choose the speed of the demonstration of a particular method is an excellent idea. However, for QUICKSORT, once a certain speed has been chosen there is no opportunity to adjust the speed, as there is during the demonstrations of ex-

ternal sorting. (For the INSERTION and SELECTION sorts, you can only step through one instruction at a time. Once you've got the hang of it though, it would be nice to be able to go ahead with the demonstration one stage at a time.) Mostly, a simple keystroke suffices to achieve a desired effect, but sometimes the user must press ENTER after the keystroke. Words like 'portion', 'sub-list' and 'partition' are used interchangeably when referring to a subset of the items to be sorted. And, of course, there's the inconsistency in the style of demonstration pointed out above.

The user is usually not given the opportunity to insert his or her own data during the demonstrations. Generally, one set of numbers is used for a demonstration. It could be more instructive to have the opportunity to see the performance of methods on almost sorted data, data in reverse order, and so on.

The version of MERGESORT given is not the generally accepted 2-way merge sort technique, although the modification is a sensible one. In this version, SHELLSORT is used to sort blocks of items before merging commences, rather than immediately merging single items from the separate files.

In summary, there are a number of ways in which this package could be improved, but as it is, it offers much for the novice user, as well as for users experienced only with the standard methods. The manner of presentation is clear and fairly well thought out. Importantly, the diskette also offers good value for money. □

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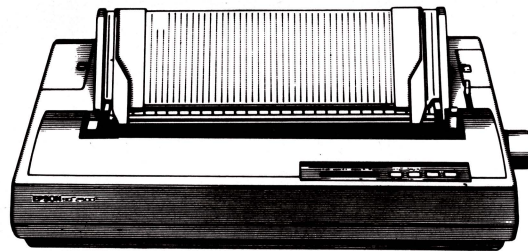
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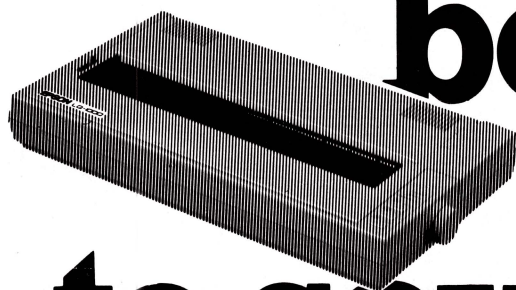
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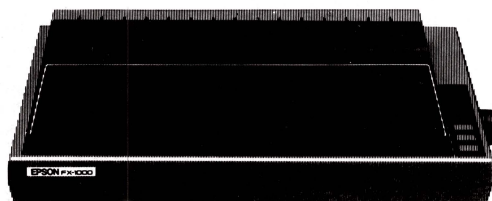
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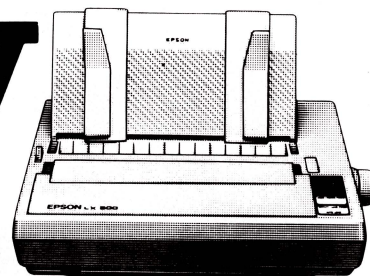
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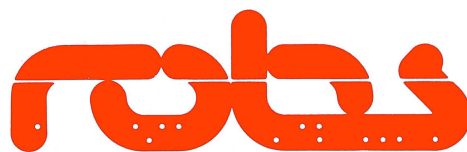
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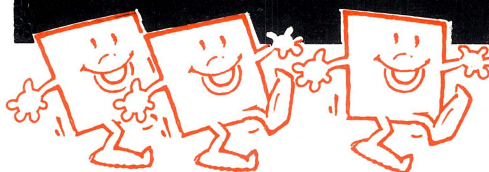
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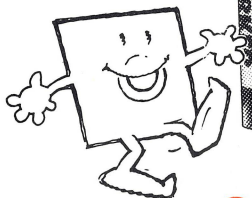
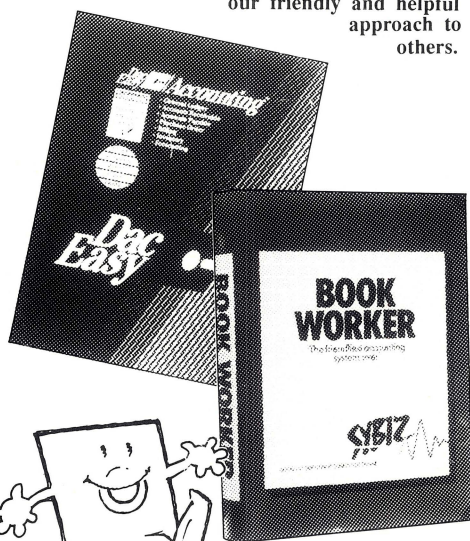
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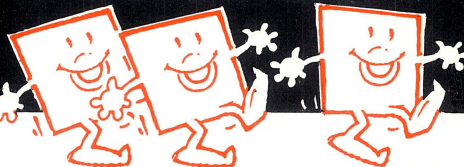
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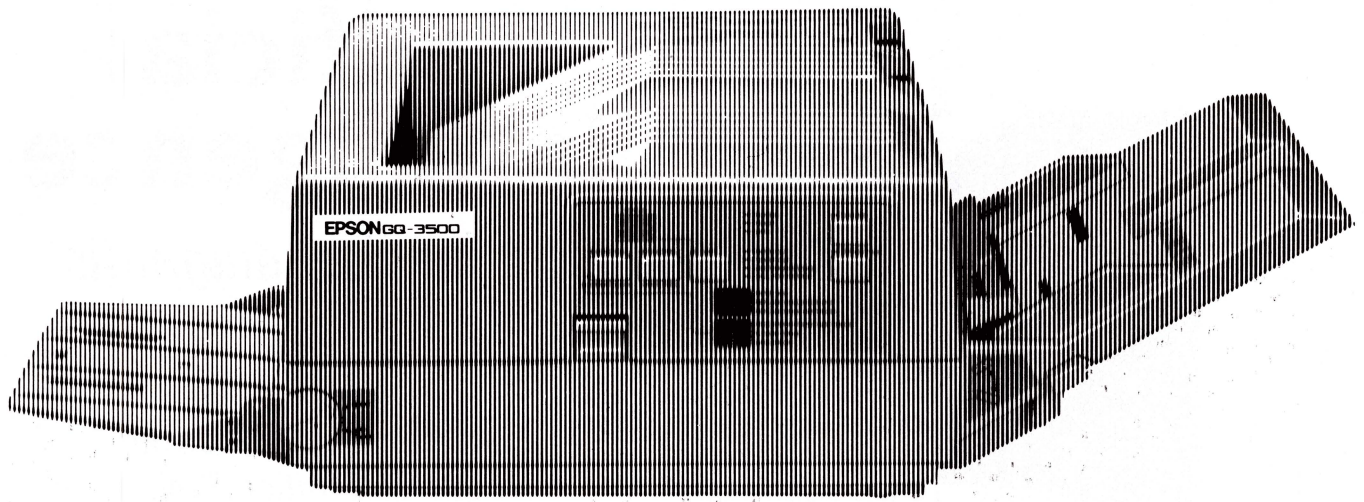
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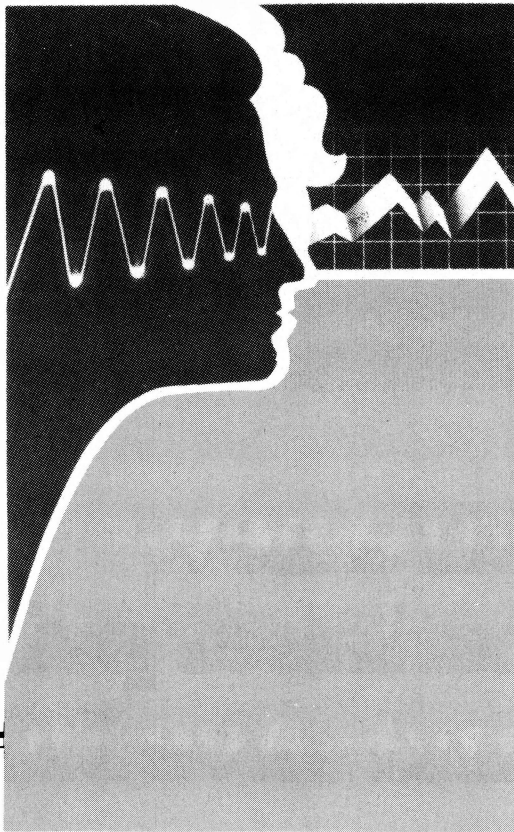
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Artificial Intelligence

for medical diagnosis

From the tumult and the shouting of the announcement that the 'Fifth Generation Project' would usher in a revolutionary post-industrial world, to the air of pale bewilderment which now swirls around the AI camp, the trend over the past five years has been towards constantly lowered expectations. But, Tim Hartnell has found one field where AI has delivered on its promise . . .



SOMETIMES YOU feel like Dorothy in the Wizard of Oz when chasing Artificial Intelligence. Just ahead, a few kilometres along the yellow brick road, shines the promise of true machine intelligence. You hurry forward, your way lit by the hype of a hundred press releases, and computer intellect recedes like the gold at the end of the rainbow.

All that metaphor is a complicated way of saying that when it comes to AI, not only are we not there yet, but we've barely begun the journey. From the tumult and the shouting of the announcement that the 'Fifth Generation Project' would usher in a revolutionary post-industrial world, firmly controlled by Japan, to the air of pale bewilderment which now swirls around the AI camp, the trend over the past five years has been towards constantly lowered expectations.

But there is one field where AI really has delivered on its promises — Expert Systems, the 'canned brains' of human experts, massaged into computer programs so non-experts can use the expertise, have proved their worth.

In the previous article in this series (YC, July '87), I looked at a fairly primitive expert system, 'The Auto Mechanic,' which was written to help total non-mechanics (like me) start their reluctant cars on a chilly Melbourne morning. (If you missed the article, the program can be downloaded from the YC Bulletin Board, (02) 699 1385). Here, we're going to look at an expert system which has slightly more lofty aims.

One of the best known, and proven expert systems, MYCIN, is getting a little long in the tooth now. However, it has shown that expert systems can work quite efficiently when the 'universe' in which they operate is tightly restricted, so we'll look at it in some detail. MYCIN was one of the first true expert systems to be developed, and many aspects of its construction are used in a number of newer systems.

Developed in the US at Stanford University, MYCIN is a powerful beast which can aid in the diagnosis of infectious diseases. It works on a rule-based method, in an area where it was not previously believed the data involved in decision making could be codified.

The program is not designed to replace a doctor, but to act as a consultant. The patient is examined by a flesh-and-blood variety doctor, who tells MYCIN the symptoms which have been observed. MYCIN then gives diagnostic advice which is very similar to that which a specialist would give in the same circumstances. As well as dispensing advice, MYCIN can explain how it reached its conclusion. A slightly modified version of the explanation part of MYCIN is now acting as an instructor for students in its field.

A further development of MYCIN, EMYCIN (for 'Empty MYCIN' or 'Essential MYCIN') was created by taking away the encoded diagnostic expertise (the 'knowledge base') and leaving the reasoning apparatus (the 'inference engine'). This has allowed expert systems on other subjects to be created by hooking new knowledge bases into EMYCIN.

The MYCIN Gang

The developers of MYCIN, who in a burst of inter-university comradeship decided to call themselves 'the MYCIN gang', began their work on the system with the idea of following the lead of a program called SCHOLAR, which was able to 'talk' very well on the geography of South America. However, they found that the medical data they were using did not fit as obviously into a neat framework as did the geographical facts, so the SCHOLAR line was abandoned.

Experimentation showed that the most fruitful developments lay in the direction of explicitly encoding specific rules (as used by human experts) which linked items in the database, rather than in trying to break these rules down to create general pathways which the decision making process could follow. Holding the rules in this way also meant MYCIN could explain why it had come to the conclusion it had, using the kind of statements which physicians themselves would use.

The Rules

The first real problem the gang had to come to grips with, once the nature of the rule base had evolved, was that human knowledge of infectious diseases does not fall into neat, mutually-exclusive packages. The barrier between one item and the next in the domain was often fuzzily defined.

That's probably clearer if you think of a physical symptom like a headache. Unlike a non-medical field where, for example, a non-functioning light means a) the power is off; b) the light bulb is up the creek; or c) the switch is busted, a headache — in and of itself — gives relatively few clues as to what illness besets a patient. Many medical symptoms are like that. However, the symptoms do 'cluster around' diseases, so several symptoms occurring at once can point the doctor in the direction of the cause.

One of the major problems that's been discovered in creating new expert systems from EMYCIN is the lack of precision in many statements made in English.

The first implementation of MYCIN had around 200 rules, which performed essentially as if they were lines being held in the form of an IF/THEN statement. There are now more than 600 rules.

Like all good expert systems, MYCIN makes its decisions in a predetermined order. The sequence is —

- 1) Decide which organism, if any, was causing significant infection;
- 2) Decide which drugs could be of use;
- 3) Suggest the best treatment; and
- 4) If requested, explain to the doctor why the decisions have been reached.

A typical MYCIN rule is shown in Figure 1 — note the number which appears after the words 'suggestive evidence' (0.7) which indicates the 'degree of certainty' the program is placing on its conclusion.

This degree of certainty is expressed on a scale which runs from +1 to -1, where -1 is the 'false' case (absolute disproof of

an hypothesis), through 0 (there is no evidence for or against the hypothesis, or the evidence could point equally strongly in both ways) to 1 (the hypothesis has been proved). The developers say that this is an imperfect system, but is one which has worked significantly well in the past, so — until something better comes along — they're sticking with it.

The rule, when printed out for doctors as shown in Figure 1, is in an easy-to-follow form. However, the rules are actually held within the program as lists in the language LISP, in the form shown in Figure 2.

Non-Experts in Action

An expert system will often be used by people who are less expert than those whose expertise is encoded in the system. This means the reasoning behind the conclusions is not always apparent. MYCIN has a subprogram called CHRONICLER which can answer questions regarding the therapy it has advocated. A dialogue with CHRONICLER looks like this —

WHY DID YOU GIVE DRUG X
FOR SITUATION Y?

X was prescribed for Y

Since

- X is often used for Y in disease Z
- item Q of patient data shows intolerance to drug P
- X is not contra-indicated

Now, 'knowledge engineering', the process of extracting knowledge from human experts and turning it into a form which can be digested by a machine, is a slow and expensive process. To allow MYCIN to im-

**If: (1) the stain of the organism is gram-positive, and
(2) the morphology of the organism is coccus, and
(3) the growth formation of the organism is clumps,
then there is suggestive evidence (0.7) that
the identity of the organism is staphylococcus.**

Figure 1. A typical MYCIN rule — note the number which appears after the words 'suggestive evidence' (0.7): it indicates the 'degree of certainty' the program is placing on its conclusion.

**PREMISE:(\$AND (SAME CNTXT GRAM GRAMPOS)
(SAME CNTXT MORPH COCCUS)
(SAME CNTXT CONFORM CLUMPS))
ACTION: (CONCLUDE CNTXT IDENT
STAPHYLOCOCCUS TALLY .7)**

Figure 2. The rules for MYCIN are held within the program as lists in the language LISP. When printed out, these same rules take the form shown in Figure 1.

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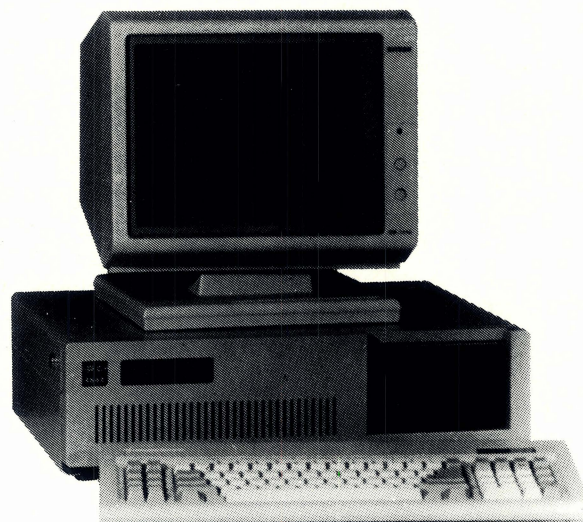
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Artificial Intelligence

prove its database by gaining new knowledge and weeding out errors, inconsistencies and omissions, a sub-program called TEIRESIAS was developed. When a physician comes across an error, or an incomplete diagnosis, TEIRESIAS can be triggered to ask a series of questions from which a new MYCIN rule can be created.

As you can see from the sample conversation in Figure 3, the sub-program has been designed to communicate with the consulting human expert in as natural a form as possible. You can also see from the sample that once the new rule has been added to the knowledge base, it is checked, with the physician being led gently through the checking process. Once the rules are in place, and have been tested and debugged, MYCIN compiles them into its internal tree structure, and then stores them in machine code.

EMYCIN

MYCIN, in common with many major expert systems, has two main components: the knowledge base and the inference engine. By 1974, two years after the MYCIN project began, the first experiments in replacing the diagnostic knowledge base with one in another field was undertaken. A Pontiac Service Manual was used as the source of expertise to give the inference engine some material to work with. (Reading about this gave me the idea to create The Auto Mechanic in July's article — a Pontiac is a mid-priced American car).

Experience in the Pontiac field and further experiments, led to the first version of EMYCIN (which stands, you'll recall, for 'Empty MYCIN' or 'Essential MYCIN') to be developed. EMYCIN consists of the MYCIN inference engine (the thinking bit),

along with a significant portion of the TEIRESIAS system (the program which allows new rules to be added to the knowledge base, via a direct 'conversation' with a non-programmer user).

If you run EMYCIN with the intention of creating your own expert system, you're lead through the creation process step by step, in a dialogue something like this (in which the user's answers are given in upper case):

> Do you want to create a new knowledge base? YOU BET, KIDDO!

> Enter a word or phrase to describe your domain: SEX AND DOPE AND ROCK AND ROLL

> Enter a one-word name for the root of your context tree, the central 'object' with which the consultation is concerned: FUN!

Once the information is in place, EMYCIN becomes an expert on that domain and can be used as an expert system.

You can see, then, that the program really has two, quite separate roles. The first role is that of accepting data and creating rules from it, and the second is one of making deductions from those rules.

One of the major problems that's been discovered in creating new expert systems from EMYCIN is the lack of precision in many statements made in English. This can be corrected to some extent in rule-making — as we saw with MYCIN — but it is not always possible to do so. How much certainty, on a scale from 0 (meaning 'absolute bull-dust') to 1 (meaning 'true') could you place on statements like 'Politicians are little better than child molesters, although not as bad as journalists' or

I'M SORRY, MR. TRUNDLE, BUT IT
INSISTS THAT YOU'VE ONLY GOT A
MINOR HEAD COLD...



'Australia is a pineapple republic'?

Despite this problem, some very effective expert systems have been developed from MYCIN. All of them have cutesy names, such as SACON, CLOT and PUFF. SACON aims to uncover an analysis strategy for a particular problem involving a specific structure, in which — and I hope you're ready for this — 'the system infers such material deflection behaviours as excessive deflection and load path bifurcation'!

CLOT gives medical advice on bleeding problems. Another medical program, PUFF, generates advice on lung diseases, while two of its offspring, CENTAUR and WHEEZE, use PUFF's knowledge base, but manipulates this base in a different way. Another program, VM (for 'Ventilation Manager'), keeps an eye on the post-operative condition of a patient after major cardiovascular surgery, when mechanical assistance with breathing is often required.

So, there you have it — A fifteen year old program, MYCIN, which has proved the value of expert systems being developed in two related, but distinct, sections: the knowledge base (the facts) and the inference engine (the mechanism to manipulate those facts). If you're intending to develop an expert system, this approach of separating the two parts of the process, is a promising one to follow. □

I hate to criticize, Dr Hartnell, but did you know that most rules in the area include a warning regarding combining drug X with drug Y, due to effect Z?

I DIDN'T KNOW THAT

Shall I try to write a clause which covers this situation?

YES, GO AHEAD

Rule xyz has now been added to the knowledge base. I will now rerun the consultation to check the effectiveness of your new rule. Get comfortable, since this may take a bit of time.

Figure 3. So that MYCIN can gain new knowledge, a sub-program called TEIRESIAS asks a series of questions from which a new rule can be created — a typical conversation is shown above.



IN THE PREVIOUS article I discussed using sampling techniques for representing sound information in computer memory. Virtually any analogue sound signal (say, from a microphone, a synthesiser, or an audio recording) can be represented as a series of numbers and stored in a wavetables in RAM. These values represent the instantaneous air pressure fluctuations of acoustic (sound) waves. The waveform of a particular sound can be expressed graphically as the variation of these pressures as a function of time.

Once this digital information is stored in computer memory, the waveform can be edited in various ways or manipulated mathematically. Serious sampling musicians might spend considerable effort and time exploiting these capabilities in their never ending search for more interesting sounds.

But, there are many possible methods for creating a musically useful series of numbers from scratch. One way is to simply 'draw' the proposed waveform, as displayed on the video monitor, into computer memory. This technique can be accomplished relatively easily using, say, a joystick, lightpen, graphics tablet or similar hardware. Other methods involve using various algorithmic techniques for calculating complex waveforms.

Before we investigate some of these algorithmic methods of digital sound synthesis, we need to consider the physical properties of sound...

Microcomputers,

This month, Andrew Symaniz travels backwards in time to the pre-MIDI era when 'bolt-ons' and software were the only way to control external musical devices.

What Is This Thing Called Sound?

Regardless of whether your record collection contains mostly Mozart, Mantovani or Midnight Oil, we can assume that all music is an ordered arrangement of repetitive waveforms.

Suppose I sample a short phrase from some continuous piece of music — say, that of a loud orchestral passage. The graph of a small slice of this extended waveform might resemble Figure 1. On playback, you probably would be able to infer certain things about the general musical context from which this sample was taken. And, if you listened more carefully, you might even be able to detect the individual notes of different instruments which combine to form part of this composite waveform.

Not only is it possible for us to perceive distinct pitches imbedded within a complex sound, but our brain can somehow extract and reassemble other waveform components (themselves very complex

vibrations) which together produce the characteristic 'sound' of a violin say, or a tuba.

Exactly how the ear/brain combination performs this remarkable magic is not understood, but, mathematical techniques have been developed that can be applied in music to resolve certain complex waveforms into a mathematical series of sine waves. These simple components are called harmonics, sometimes referred to as sound partials or overtones.

This process is called Fourier analysis. It is also the method used to determine the frequency spectrum of a particular sound.

The kinds of sounds that best exemplify the simple beauty of Fourier analysis are those that exhibit periodic (regular repeating) waveforms — or very nearly periodic. These are the sounds which we generally perceive as having a definite musical pitch. They include the notes played on most traditional musical instruments such as the violin or tuba (as distinct from the more 'noisy' variety of sounds made

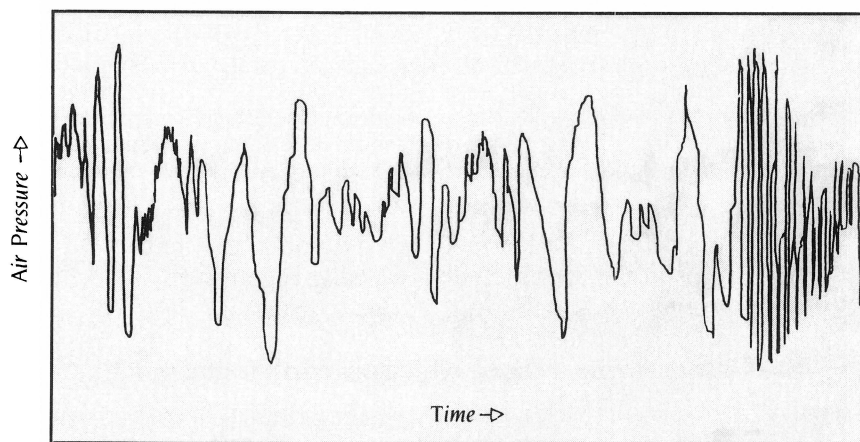


Figure 1. The waveform of a particular sound can be expressed graphically as the variation of air pressures as a function of time. When this waveform is played, the brain can somehow extract and reassemble other waveform components (themselves very complex vibrations) which together produce the characteristic 'sound' of a particular instrument. Exactly how the ear/brain combination performs this remarkable magic is not understood, but mathematical techniques can resolve complex waveforms into a series of simple sine waves. These simple components are called harmonics, and the process is called Fourier analysis.

MIDI, and Music

Digital Sound Synthesis

by percussive instruments such as drums).

If these elemental components (separated out via Fourier analysis) are added together in their correct proportions — *voilà!* — our original complex waveform is restored. This complementary process is called Additive or Fourier synthesis. In principle, any complex waveform that occurs in nature could be considered to be the unique sum of a very large number of simple sine waves that vary continuously in pitch, amplitude and, to a lesser extent, phase.

The four main audible elements of any musical sound are its volume, envelope, pitch and timber (or tone colour). Volume measures the average amplitude of the waveform. The envelope of a waveform roughly follows the contour of an imaginary line that connects successive amplitude peaks, starting from the very beginning of a sound (attack) to its conclusion (final decay), as shown in Figure 2.

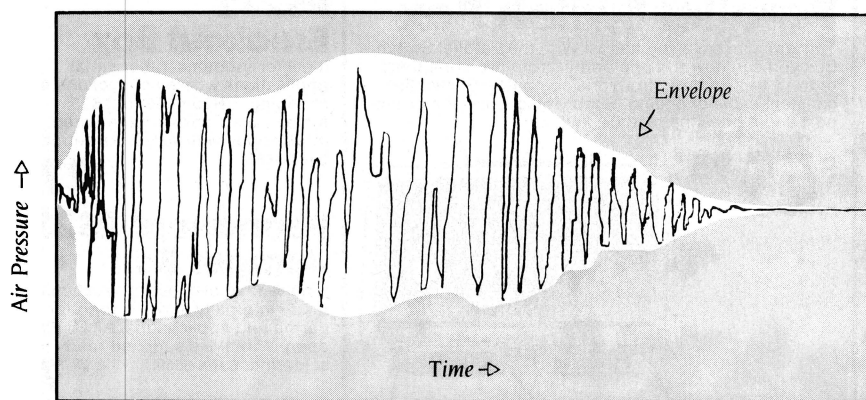
Our perception of pitch and timbre are closely related. Both are dependent on the frequencies and relative amplitudes of the various harmonics that constitute a particular sound.

Mathematically speaking, the harmonics contained within periodic waveforms

are mostly whole-number multiples of some fundamental harmonic. The frequency of this (so-called) first harmonic, generally corresponds with our perception of the pitch of that particular sound.

During the playing of a sound, the harmonic content (frequency spectrum) of successive waveform cycles, usually varies in ways neither totally predictable, nor completely random. The relative loudness of each harmonic during the sounding of the note changes in ways characteristic of that particular instrument. In the case of the trumpet, say, its lower frequency harmonics tend to have larger amplitudes during the early (attack) stages of a note, whereas most of the higher frequency harmonics are louder in the intermediate stage (following the initial attack, but before the onset of final decay).

Moreover, the characteristic changes in harmonic content for one note of a particular instrument, can be quite different for another note in the scale — especially those in distant octave ranges. In other words, the amplitude envelope profiles (loudness versus time) for each harmonic can change, sometimes quite dramatically according to the pitch of the first harmonic.



◁ Attack ▷ ▷ Initial Decay ▷ ▷ Intermediate (Sustain) ▷ ▷ Final Decay ▷

Figure 2. The envelope of a waveform roughly follows the contour of an imaginary line that connects successive amplitude peaks, starting from the very beginning of a sound (attack) to its conclusion (final decay).

Most multi-sampling keyboard synthesizers can simultaneously store several different samples of a particular instrument in memory. These independent sounds might be assigned to specific ranges of notes across the keyboard — instruments with this capability usually sound more 'natural' than another that uses only one sampled source sound per voice.

The reason for this is that when a sound is transposed over a large musical interval (say, one or two octaves), the various harmonic interrelationships remain static. It is this unnatural treatment of harmonic detail that causes the infamous 'chipmunking' effect when speeding up any recording — analogue or digital.

Also the pitch of notes played on certain acoustic instruments can change dynamically. This might be done purposely by players as part of their personal playing style. Depending on the instrument, a player might slide up to notes, for example, or apply some form of pitch modulation such as vibrato (rapidly sharpening and/or flattening a note in succession).

However, pitch modulation effects can be intrinsic to the nature of the instrument. For instance, sounds played on most stringed instruments are subject to slight increases in string tension. As the string vibrates, the pitch is raised by subtle degrees. This effect is further complicated by loudness or whether the string is plucked, bowed, or otherwise set in motion.

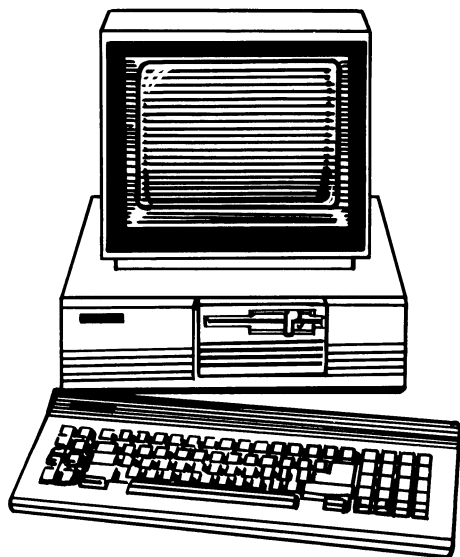
Finally, most percussion instruments such as drums and gongs tend to produce sounds with extremely complex waveforms. These kinds of sounds appear to be composed of clusters of harmonics that are not exact multiples of some unique fundamental frequency. This makes it difficult for us to identify them as having an exact pitch. (We'll investigate this in a later article.) ▷

Computers and Music

THE INTRODUCTORY article to Andrew Symaniz' series on Microcomputers, MIDI, and Music appeared in our April '87 issue. His topic in the May issue was the programmable sound generator and in June, digital sound sampling. If you'd like to catch up with the series, refer to the Services page on how to obtain back issues. And, let us know what music (and computer) related topics you'd like to know more about — drop us a line. □

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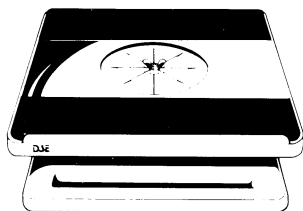
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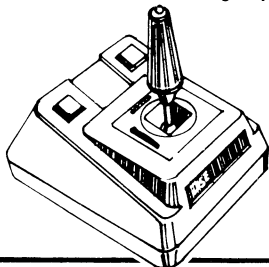
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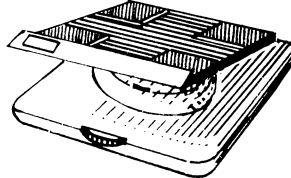
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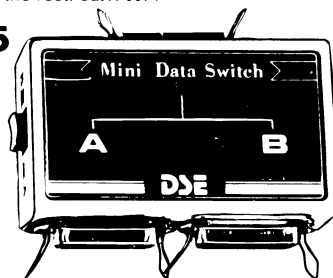
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\$15⁹⁵

RS232 Breakout Box

Ideal for modems, other serial applications where connections need changing. DB25 male to DB25 female, pin 1 permanently wired, all others open with wire links supplied.

Cat X-3568

\$27⁵⁰

Permanent RS232 Jumper Box

Similar to above, but connections made internally and soldered for permanent applications. All 25 pins open. Wire links supplied ready for soldering. Cat X-3569

\$17⁵⁰

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The four main audible elements of any musical sound are its volume, envelope, pitch and timber (or tone colour).

To summarise — there is a distinct 'musical' type of sound which is comprised of at least one fundamental harmonic plus some combination of mathematically related harmonics, all superimposed together. Each of these harmonics undergoes continual amplitude variation and (perhaps) subtle pitch variation throughout the duration of a note. This dynamic interplay between harmonic frequencies and their relative amplitudes, contributes to the characteristic timbre, or tonal quality, of a particular musical sound.

Digital Sound Synthesis

It would seem then, that we could generate musically useful pitched tones via wavetables in RAM, without too much trouble, according to the principles of Additive synthesis. With appropriate software, all we need to do is specify the amplitude envelope and frequency envelope of each harmonic for each note. The computer could then process all this information (by adding all the harmonics together) to create complex waveforms.

Although this technique is a very powerful one, and very educational, it can be extremely time consuming. For each tone colour, you might specify perhaps as many as a hundred or more harmonic envelopes. You might find that most of your time would be spent programming in all the amplitude and pitch changes, instead of playing music.

Dedicated computer instruments that offer comprehensive additive synthesis facilities (such as the Synergy, Fairlight,

CMI, or Synclavier), are usually very expensive — fully featured, they can cost well over \$100,000.

However, you don't have to be a super-rich, superstar-with-everything to enjoy some of the pleasures of digital sound synthesis . . .

Coming up . . .

In the past few years, there have been quite a number of fairly inexpensive computer add-on packages, released by various manufacturers, that incorporate (limited) additive sound synthesis. These are a lot cheaper than their bigger brothers and usually attach directly into the expansion slots of Apple II computers, or similar. Some of these systems also include musical keyboards, advanced sequencing software, music transcription and printing options — this will be our topic for next month. □



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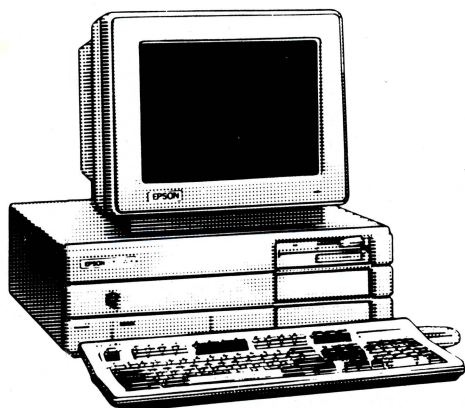
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Postcodes on the Button

How do you find those elusive postcodes easily.

Ewart Stronach found thousands in two new programs and certainly no typist should be without one of them.

TWO MINDS WITH but a single thought and I suspect that thought was 'What the hell is the Postcode for Xantippe'? (It's 6609 for those of you not on intimate terms with Australian geography).

Faced with the task of finding the right postcode in my house depends on being able to find the A-K section of the Sydney phone book and looking in the back pages. Have you ever noticed how the volume you don't need takes up valuable desk space and the volume you need is three city blocks away by the shortest possible route?

The solution is found in either of two programs recently released, 'Postcoder' and 'Postcode'. (Well, what else could you call them?) They serve exactly the same purpose, are simple to use and no typist should be without one of them.

Postcode

Postcode from FBN Software, (062) 86 1102, priced at \$49 including tax, was the first I tried. The program loads into memory from the floppy or can be installed easily on your hard disk and is called up in your opening batch file.

It resides in memory, taking up a remarkably small 15 Kbytes and is invoked with a 'Ctrl Plus' key combination. A menu screen (FIG 1) appears as an overlay from any application program you may be running.

The screen displays 11 postcodes, starting at Abba River. (I didn't know they were *that* famous). Simply type in enough letters to identify the town or locale or post office you need and a new screen is displayed with your code in highlight. If you

PostCode version 1.0a Copyright (c) 1987 FBN Software

Enter locality name or scroll codes with Cursor Keys
Press [Enter] to send PostCode, [Esc] to exit

ABBA RIVER	WA	6280
ABBEY	WA	6280
ABBOTSFORD PT	NSW	2046
ABBOTSFORD	NSW	2046

POSTCODE SEARCH REQUEST

LOCATION: YEPPON

POSTCODE LISTING

YEO		3249
YEOBURN EAST		3579
YEOBURN		3249
YEOVAL		2868
YERECORN		6571
YERING		3770
YERINGBERG		3770
YERONG CREEK		2642

F1 Search = F2 Exit/Place = ESC Exit

Top. An example of the window for FBN's Postcode starting from Abba River (Abba are that famous hey?). **Bottom.** Postcoder, from Plantech, shows Y they are good for checking up postcodes.

have misspelt it, the nearest spelling will be displayed. If your spelling was right, the relevant postcode is loaded into the keyboard buffer and pressing the Enter key will transport the postcode to the cursor position in your application and clear the screen. If you simply needed to see the postcode, Escape will clear the screen.

There is provision for adding postcodes if required and the packing of the files is automatic, if a little lengthy in its operation.

Postcoder

Postcoder, from Plantech (03) 696 1253, priced at \$133 including tax, is so similar in its operation that for all intents and purposes, usage of the two programs is exactly the same. Postcoder loads into memory in the same way and is called into action with 'ALT TAB'.

The first display from Postcoder is a narrow box headed 'Postcode Search Request'. Simply type in your unknown destination and another box appears (Fig 2) with the requisite code in highlight. The bottom line instructs you to use F1 for further searches, F2 to place the code in your application and exit, or F3 to exit without using the information.

Both programs are well documented and so simple that very little documentation is needed. Both work as described and neither seem to clash with any other memory resident software that I have installed. The decision of which to buy boils down to price and without a doubt, this is one of the rare occasions that something of value has come out of Canberra. □

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- U35. DISPLAY COMMENTS FROM CONFIG.SYS** file when booting up.
- U36. BUILD DIRECTORY FILE WITH COMMENTS.** Has asm source code so that you can tailor to own needs. Produces list of files with size, crc, file no. and space for comments.

FILE PRINTING/EDITING

- U130. PRINT ITALICS.** Set printer for output in italics. Epson compatible.
- U131. PRINTER RESET.** Resets printer to power-up mode.
- U132. GRAPHIC SCREEN DUMP** for Epson compatibles.
- U133. SET 51 LINES PER PAGE** on Epson compatible computer.
- U134. SET 132 COLUMNS PER PAGE** on Epson compatible computer.
- U135. SET UNDERLINE MODE** on Epson compatible printer.
- U136. SET COMPRESSED PRINT** on Epson compatible printer.
- U137. SET ENLARGED PRINT** on Epson compatible printer.
- U138. SET WIDE PRINT** on Epson compatible printer.
- U139. SET EMPHASISED PRINT** on Epson compatible printer.
- U140. SET EXTENDED CHARACTERS** on Epson compatible printer.
- U141. PRINT SPOOLER.** Creates a 16k buffer in memory, which allows you to do other work whilst printing.
- U142. DISK-BASED PRINT SPOOLER.** Uses capacity of disk as buffer for printing, allowing you to continue with other work.
- U143. SEND ESCAPE (ESC) SEQUENCES** as part of command, such as for printing.
- U144. WORD FREQUENCY.** Counts number of times each word is used in a text file.
- U145. FAST WORD COUNT.** Provides count of words, characters, lines, plus a mathematical check sum, which allows you to compare text files for changes.
- U146. APPOINTMENT REMINDER.** Stores data on disk like a daily appointments diary. Prints details of next 7 days.
- U147. PRINT WITH NUMBERED LINES.** Great for listing source coding.
- U148. SIMULTANEOUS EDIT** of multiple text files. Lets you make the same text changes to several files at once.
- U149. WORD LENGTH ANALYSER.** Checks the length of words in text and compares with readers' level of schooling.
- U150. TEXT CHECKER.** Examines Wordstar files for typing errors such as missing brackets and quotes.
- U151. TEXT FILE SORT.** Fast and works with very large files.
- U152. LIST NON-ASCII BASIC FILE** without loading Basic. Also helpful for listing if you don't have Basic/GWBasic.
- U153. PAUSE LISTING** so that printer will produce 55 lines on a page.

EQUIPMENT HANDLING

- U406. CONTROL BACKGROUND/ FOREGROUND COLOURS** as displayed on your monitor.
- U407. HARD DISK PERFORMANCE TEST.** Checks the running of hard disks.
- U408. COMPUTER LOG** to keep track of amount of time of computer usage, how time spent.
- U409. ELECTRIC TYPEWRITER.** Converts computer into electric typewriter (for notes, envelopes, etc.).
- U410. KEYBOARD OPTIMISER** that will set cursor size, give type ahead buffer, more. Easy to use command line editing.
- U411. MAP RESIDENT PROGRAMS.** Shows program addresses, possible conflict.
- U412. TRACK MEMORY** as programs are running. Has windows and more.
- U413. MEMORY ORGANISER.** Determine, mark, release, allocate, display memory. Shows how files are loaded in memory.
- U414. MULTI-SCREEN.** Allows output to be directed to more than one screen. Needs CGA. Multitasking features.
- U415. NEW ANSI.SYS** that may aid screen presentation and allow faster execution of many functions.

- U416. BLACK & WHITE MODE** can be switched on colour graphics card.
- U417. TIMEPARK HEAD** of hard disk after a specified time has elapsed.
- U418. SET 40 or 80 screen columns** BW mode on colour systems.
- U419. STATUS REPORT** on system, including information about drives, memory available.
- U420. SPEED TEST (1)** checks processor speed and compares with IBM-PC. Similar to Norton test.
- U421. SPEED TEST (2)** checks computer speed in two areas, including Sieve calculation and track to track access time, and compares with IBM-PC.
- U422. SPEED TEST (3)** comprehensive checks on processing, including block write, register/memory, multiply, divide, stack operations, far jumps, etc, and compares with IBM-PC.
- U423. RAM TEST.** Tests and tests and tests ram. Identifies faulty memory.
- U424. DOS ENVIRONMENT VARIABLE EDITOR.** Make changes to edit path, prompt, etc.
- U425. EXPAND DOS ENVIRONMENT SPACE TO 1K.**
- U426. FLIP ON/OFF (TOGGLE) DOS PARAMETERS.** Works on several standard Dos parameters.
- U427. WHAT PROCESSOR?** Examines and identifies the processor/s being used, such as 8088, 8086, etc.
- U428. WHAT DEVICE DRIVERS?** Examines and reports on devices (leg ports) installed in your computer.
- U429. WHAT DOS CONFIGURATION?** Examines and reports on memory, vector addresses, and statistical information about version of Dos you are using.
- U430. WHAT EQUIPMENT?** Examines your equipment and reports on the installed drives, type of cards (eg, printer, colour, mono, RS232) etc.
- U431. EDIT RAM STORAGE** in your computer.
- U432. DRIVE STATUS.** Reports on no. of bytes, sectors, clusters-what capacity is and how much is free.
- U433. DIAGNOSTICS.** Performs large number of computer diagnostics and reports on serial, parallel ports, video, etc.
- U434. DRIVE TEST.** Floppy disk test drive utility.
- U435. SLOW AMSTRAD 1512.** Programs e.g. games that run too fast.

FILE MOVING

- U511. HARD DISK UNERASE.** Exceptional features. Most unerase utilities don't work on hard disk – this one does!
- U512. DELETE ALL BUT** those programs you identify.
- U513. INTELLIGENT COPY PROGRAM** that creates sub-directories as part of the transfer. Also renames rather than over writes.
- U514. SUPERIOR COPY PROGRAM** that checks and evaluates target before copying. Eg, copies last dated version.
- U515. UNIQUE COPY PROGRAM** with same function as U514 but does not copy those already on target disk.
- U516. TREE SURGERY.** Prune files unwanted/ duplicated on hard disk. Has source code and compares files with the same name.
- U517. KILLDIR.** Delete a branch of a directory. Reduces steps and saves time.
- U518. MOVE DIRECTORY** around if you prefer it stored in different location.

FILE ORGANISATION & CHECKING

- U611. BOMB ALERT.** Examines new files for malicious intent and reports on possible danger to other files.
- U612. BASIC MENU GENERATOR.** Better access to your Basic files through a menu. For Basic/GWBasic.
- U613. UNSQUEEZE ARC FILES.** Small, efficient utility that occupies less space and is simpler to use than Arc.Exe.

- U614. HARD DISK OPTIMISER.** Related group of files that optimise hard disk usage and eliminate file fragmentation. Helps pack the disk.
- U615. FILE RE-ORGANISER.** Regroups a fragmented file into contiguous sectors on a disk for more efficient disk access.
- U616. RECOVER BAD SECTORS.** Records data on disk. Does 12 retries and thus may recover bad sectors.
- U617. COLLECT BAD SECTORS.** Marks bad sectors for collection into a separate file that will not be used. Works with floppies and hard disk.
- U618. ADVANCED COMPARE** facility that can save as edlin script, generate and update deck.

SPECIAL FEATURES

- U805. PREPROCESSOR FOR "C" COMPILERS.** Has "C" source and helps organise coding into efficient form for compiling.
- U806. VOICE EMULATION.** Compiled with Basic source module which allows extensions, revision or use as tutorial.
- U807. DEMONSTRATION OF COMPUTER GRAPHICS** for those who have CGA.
- U808. DAYS SINCE JAN 1ST.** Calculate no. of days elapsed since beginning of year. Needs Basic/GWBasic.
- U809. BINARY FILE CONVERTER.** Converts files from machine language to hex equivalent for examination and modification.
- U810. CAPTURE BIOS** contents and store in a separate file.
- U811. EXPLORE FAT (FILE ALLOCATION TABLE).** Shows the table entries, starting clusters of files, etc.
- U812. MINICALC.** A small, easy to use spreadsheet with 11 x 22 cells for quick every day use.
- U813. PROGRAMMER'S CALCULATOR** which does special hex and other calculations for those writing programs.

ORDERS:

The service charge for each programme is \$3. There is a minimum charge of \$15 (five programmes). Add 20% Sales Tax plus \$3 for postage and packaging.

ORDERS MUST BE PREPAID.

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SELECT SOFTWARE, Box C343, Clarence St., PO, Sydney NSW 2000 (Office: 3 Barrack St., Sydney, NSW)

TELEPHONE ORDERS:

Pay by Bankcard, Mastercard or Visa. (02) 29 2866, (02) 29 3810, Fax (02) 262 1290.

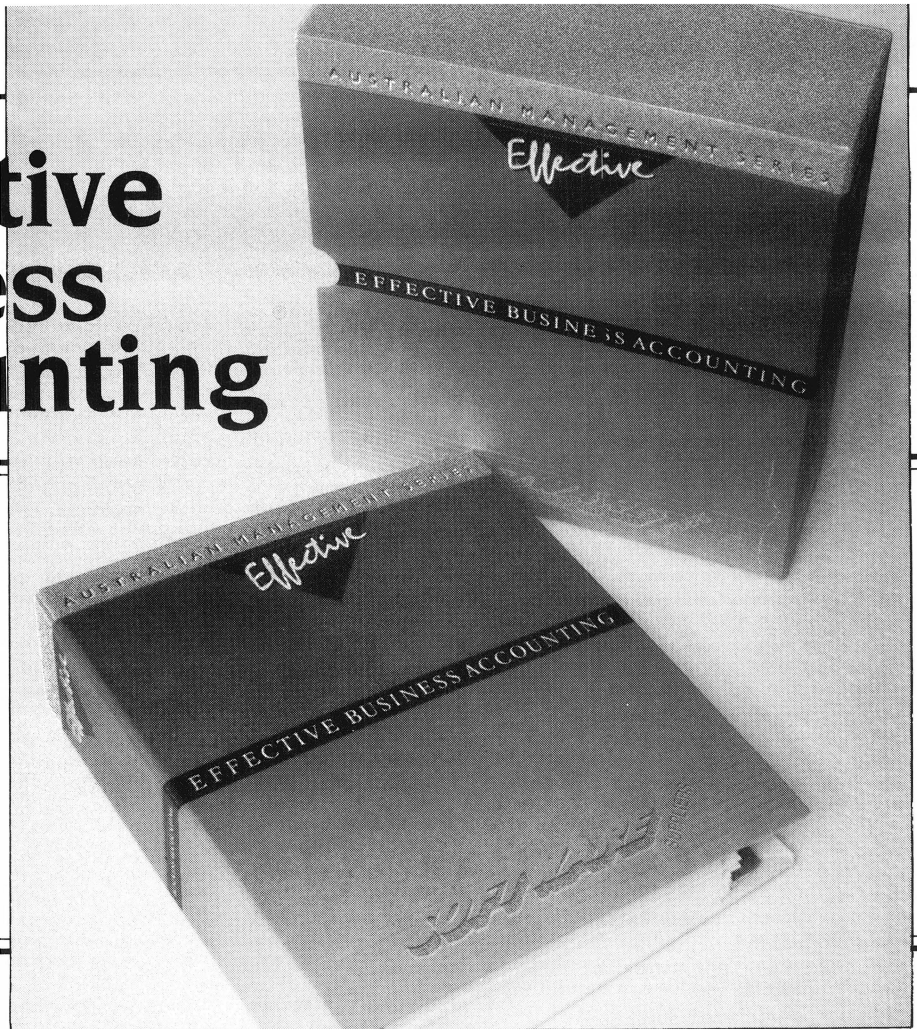
We cannot guarantee the suitability of programmes for users needs or equipment.

CIRCLE NUMBERS BELOW AND SEND TO US WITH PAYMENT AND YOUR NAME AND ADDRESS. OR TELEPHONE US WITH THE PARTICULARS. SEE ABOVE.

14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31
32	33	34	35	36	130	131	132	133
134	135	136	137	138	139	140	141	142
143	144	145	146	147	148	149	150	151
152	153	406	407	408	409	410	411	412
413	414	415	416	417	418	419	420	421
422	423	424	425	426	427	428	429	430
431	432	433	434	511	512	513	514	515
516	517	518	611	612	613	614	615	616
617	618	805	806	807	808	809	810	811
812	813						435	

Effective Business Accounting

Still knee deep in scraps of paper, sorting out your tax? Now's the time to get ready for next year with a package like this one. John and Vic Beacham report that it's suitable for small businesses and new users.



THERE HAVE BEEN cases where we've picked up a package, taken one quick look at it, and never wanted to touch it again. We have also seen organisations buy the most 'cost effective' system and it's proved totally unsuitable for their needs.

Generally, our advice is don't bother with anything priced under \$300 as we believe that 'you pay for what you get' and, evaluate the package for suitability before you make a final decision. Our joint experience includes 23 years in accounting and 17 years operational management — this has proved to be a good combination when evaluating accounting packages.

After taking the program apart and testing its 'real world' suitability, we found that, in general, Effective Business Accounting (EBA) is most suited to the small to medium business environment, particularly the service type industries that don't have extensive inventories.

EBA is supplied in the typical IBM type hard cover, three-ring binder with box cover. However, it is neatly presented and the text is well defined and easy to read. It seems that a great deal of effort has gone into making this 'literature' suitable for new users. It includes —

Introduction to Computers to take you through the basic MS-DOS commands and syntax; *Introduction to Accounting* explains elementary accounting information in the Queen's English;

Getting Started helps you through the primary installation, starting operations, system controls and backing up data;

Operations Manual explains by use of text and screen layouts the various functions and operations of the system;

Appendix gives sample operational reports, forms utilised and Basic Error Messages.

And, each section has its own index.

In effect, it is quite likely that the majority of first time users who take the time to read the manual will get immediate benefit and a better understanding of this system and the computer they are using.

Hardware

Hardware requirements for EBA are IBM PC or compatibles with 256K of RAM and 2 x 360 Kbyte floppies. The valuable peek function, of which we'll talk more later, requires that you have a colour graphics adaptor (CGA) with a mono or colour screen. It is recommended however, that the users have a hard disk as the annoyance and limited data capacity of dual floppy systems is not really worth the savings in costs.

Overview

The program is divided into three major areas: Transaction; Enquiries/reports; and File Maintenance.

These divisions are neatly displayed on the main menu with all Debtor (Customers), Creditor (Supplier), Inventory (Stock) and General Led Options. This offers the first time user or those with little computer accounting experience the ability to move freely between all facets of the program with a reasonable degree of certainty they are moving into the correct area. This approach is very functional as users aren't required to switch between major account area main menus to perform various day-to-day processing. It would be difficult to imagine getting lost in this system.

EBA is supplied with an optional, preconfigured Chart of Accounts that can be used and/or modified to suit most company requirements. Once linked, produces an accurate and effective, easy-to-use business tool.

Another nice feature of EBA, is that it's supplied with a sample company that is fully operational in all aspects to assist first time users in understanding how it all works. It also allows the more experienced user the ability to test the results of any

modifications they may choose to make before actually implementing changes.

The software was easy to install and all the manual's prompts and directions worked first time with no confusion. Nevertheless, on hard disk computers, the system should be installed by a competent person to ensure the correct set-up. An adequate autoexec and/or batch file is in the root directory for ease of operation once EBA is installed.

General Ledger

The General Ledger system employed is the standard format utilised by most accounting systems excepting that the user is offered a short name search and sort key for quick referencing.

The supplied Chart of Accounts requires alteration to accommodate sole traders and partnerships. This could lead inexperienced users into costly errors and it would be recommended that users involve their accountant in the initial set-up of the General Ledger.

The Bank Reconciliation Worksheet is just what the doctor ordered, in that it is produced in the same format as a typical Bank Statement. This may not suit the accounting purist, but it makes bank reconciliations a simple task. Then, to add some flavour to our delight, Automatic Journals are noted on the worksheet, leaving Bank Fees and charges the only extra items to be posted.

Overall, the General Ledger aspects of this program are sufficient to meet the needs of the small to medium sized operation. But — as there is no data exporting facility available for use with, say, a spreadsheet program, management reporting is limited.

Customers

The Customer (Debtors) facility with EBA is quite impressive and offers some outstanding features —

PEEK: is the ability to view data in the Customer, Supplier, Stock and General Ledger files whilst processing customer and supplier invoices, credit notes, cash receipts and payments, and general journals — this is a valuable tool for main-

Effective Business Accounting (1.1)		System date 12.04.87
TRANSACTIONS:	ENQUIRIES, REPORTS:	FILE MAINTENANCE:
Cash Receipts 1	Stock/Trading A/c's 11	Stock/Trading A/c's 21
Cash Payments 2	General Ledger A/c's 12	General Ledger A/c's 22
Customer Orders 3	Reserved 13	Reserved 23
Supplier Orders 4	Reserved 14	Reserved 24
Customer Invoices 5	Customer Accounts 15	Customer Accounts 25
Automatic Invoices 6	Reps./Commissions 16	Reps./Commissions 26
Supplier Invoices 7	Supplier Accounts 17	Supplier Accounts 27
General Journals 8	Sales Tax 18	End-of-period Reset 28
Automatic Journals 9	Automatic Journals 19	System Control 29
Statement Charges 10	Bank Deposit/Rec'n 20	Data Files Set-up 30
Selection ? (1-30, Date, or Exit) 		

Figure 1. EBA's main menu is divided into sections corresponding to the three major modules: Transaction, Enquiries and reports, and File Maintenance; the options for each are listed below the headings.

taining the system and processing customer orders. This type of flexibility is not found in many single user systems.

Automatic Invoicing: We have a sneaking suspicion that this system was written for the service industries as this facility is by far the best we have seen in the marketplace for a single user system.

Salesman Commissions and Bonus: Too often systems only allow for one or two commission percentages and these are normally based on total sales. EBA offers five commission rates and goes one further by allowing the user to set bonuses on particular stock items.

Cash Receipting: The user has the ability to select customer, general ledger or stock item accounts from the one program just by pressing the return key. This in effect permits handling mixed batches of receipts without changing modules. This feature goes a long way to lessening the impact of computerisation on a manual system.

Overall, we found the general customer and order processing facets of this system to be of a very high standard. They are easy to master and utilise.

Suppliers

The Suppliers (Creditors) facilities are adequate to handle most trading contingencies. The reporting is light-on but what is produced should allow the user to effectively manage.

Again, the inability to download information to other software reduces the effective utilisation of data stored for management reporting and analysis.

PEEK is available during the processing of cash payments and supplier invoices which, in a substantial way, gives some compensation for the lack of reporting functionality.

EBA does provide one little gem in this function. During cash payments, the user has the ability to move between either suppliers or general ledger. This should reduce processing time.

Product Details

Product:	Effective Business Accounting
From:	Software Suppliers
Distributor:	Software Suppliers 7 Avon Rd, Nth Ryde 2113 NSW (02) 888 1955
Price:	\$675 taxed \$69 Evaluation Kit (deductible from price of system)



WARNING-SMOKING IS A HEALTH HAZARD

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APB4509-C JWT1443K1

Inventory

The inventory system is not as powerful as we would like — particularly the fact that the Customer Orders program does not tie the stock allocated to a debtor nor does it delete stock from the on-hand field. Instead it accumulates a total of allocated stock which is reduced during invoicing no matter who the customer.

EBA does have some very good stock controls, though — the 'stock type' field, in particular. This facility is extremely useful for the service and hire industries where no physical stock exists.

The ability to utilise four pricing levels gives the user that extra flexibility of price control that is normally not found in smaller accounting systems.

The provision for an additional taxable scale is forward thinking should the mooted consumption or VAT taxes ever be introduced. The commissions fields have been well thought out and will benefit those organisations who pay commissions and/or bonuses.

Invoice 24		Date 12.04.87		Customer a/c no./code 1	
JOHNSON & JOHNSON LIMITED 77 PACIFIC HIGHWAY ST. LEONARDS, N.S.W. 2120				Special ▶ NATIONAL WAREHOUSE Inst'ns ▶ UNIT 4, MOBBS LANE NORTH FAIRFIELD	
Order no. 345-998	S/tax no. 123-456-789	Customer reference URGENT ORDER		Rep. 1	
Credit limit \$100	A/c balance \$10,676.15	including		\$102.00 Invoice total	
Code	Description	Qty.	Price	Disc.	Net Value
WIDGET	BATTERY-OPERATED WIDGET	2.00	1.50	0.00%	\$3.00
3	FORTY-EIGHT TOOTH SPROCKET	66.00	1.50	0.00%	\$99.00
					\$102.00
4	HEAVY DUTY COIL SPRINGS	1.00	38.50	0.00%	\$38.50
SPRING	HEAVY DUTY COIL SPRINGS	-1.00	38.50		-\$38.50
SPRINGS SUITABLE FOR MODEL 27 ONLY					
1					\$102.00
End Invoice		Comment line(s)			
Sundry income		* (long) sub-total			

Figure 2. The Customer account screen — note 'PEEK' ON in the lower left corner. This function gives the ability to view data in other files (Stock or General Ledger, say) whilst processing customer and supplier invoices, credit notes, cash receipts/payments and general journals.

Conclusion

The Effective Business Accounting package does have some limiting factors but these are more than outweighed by its many practical (and some unique) features. The system is easy to use — by our reckoning the package will find ready ac-

ceptance, particularly with service oriented businesses.

The facets that really attracted us were, the Peek function, the standard of documentation, and the logical screen layouts. □

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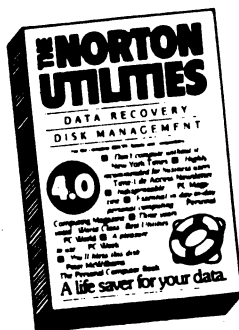
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Peter Norton
COMPUTING

Open Access II vs

The legion of PC spreadsheets is currently lead by 1-2-3 followed by the cohorts of Open Access and SuperCalc, then a host of others. John Nicholls found that all the leaders are mature products, each with its strengths and weaknesses — so how do you choose between them?

IS OPEN ACCESS a rival to 1-2-3? Many people think it is, including Rob Knights of Rob Knights & Co., a Sydney firm of chartered accountants. Rob's firm makes extensive use of both products, but their emphasis is moving towards Open Access. More about that later.

Open Access was originally sold as an integrated package, comprising database, spreadsheet, graphics, word processor, communications, and desk accessories. It is still available in this form, but each module is now also available separately. We received the Open Access II spreadsheet and graphics module which makes it directly comparable to 1-2-3.

What You Get

Lotus 1-2-3 comes in a substantial slipcase containing a reference manual, a tutorial, a *Getting Started* booklet, and a box with the six disks, keyboard templates, registration cards and a number of notes and advertising material.

Open Access II comes in an almost identically-sized box containing a combined tutorial-reference manual, a smaller utilities manual, several booklets and a solid binder with the five disks. The tutorial-reference manual has only half the number of pages of the Lotus reference manual.

The Open Access manuals are quite uninspiring and lack any use of colour. Of more serious import is the fact that the indexes are sketchy and make finding something quite difficult. The manuals for both programs have useful glossaries, and Open Access also has a long list of error messages with explanations of each, while Lotus ignores error messages altogether. To me, the manuals are the least satisfactory part of Open Access.

Installation

Lotus includes separate instructions for single disk, double disk and hard disk systems. They cover the care of disks, backing up, the installation procedure, and installation on a hard disk.

All assume little knowledge about computers, and should give no trouble except for the hard disk installation, which is complicated by reason of the copy-protection method. The inclusion of pamphlets giving alternative installation instructions helps somewhat.

When you need to choose what hardware you are using, Lotus seems to have provided for all possibilities whether for the computer, monitor or printer.

Open Access requires two disks or a hard disk, but apart from this, the instructions follow the same lines. They are not straightforward, for after telling you how you start or restart the computer (the most elementary step), they invite you to

select the Screen Configuration from a list reading —

Monochrome 1
Monochrome 2
Monochrome 3
Color 1
Color 2
Color 3
Black & White
Composite
Composite 2

Not being sure of what to enter here (for a dual-mode Compaq) I invoked a Help screen which told me: 'You do not have to learn what these mean in order to select a screen configuration. You need only select one and see how it affects the screen. You do this by highlighting the appropriate option using the arrow keys, and pressing the <do> key. Once satisfied with the screen configuration, press <do> to accept it.' So — simply try them all out to find out what does what!

The next choice was worse — I was asked to select a Graphics Driver (would a novice know what a driver is? I doubt it). The choices were —

IBM3.DRV
CLRPLUS.DRV
HERCULES.DRV
EGA4.DRV
EGA16.DRV
ATT.DRV
ERC.DRV
COR400.DRV
COR325.DRV

Again I called on Help, but all I got was 'If your driver is not presented in the list,

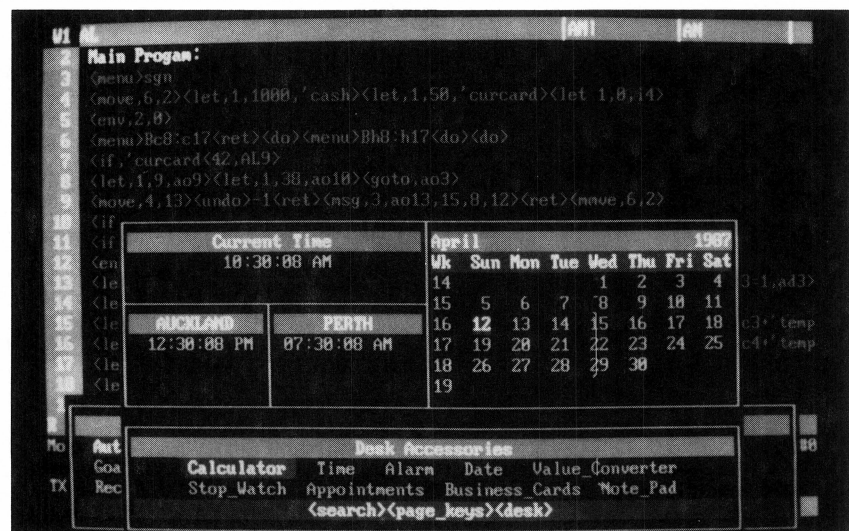


Figure 1. The Desk Accessories window in Open Access.

Lotus 1-2-3

then please select the default driver, as many cards will be completely compatible with this.' I stayed with the default choice (IBM3.DRV), not knowing what any of them meant.

Finally, the manual gave the recommended way to use the Sample Data disks —

- 1) Make a new sub-directory on the hard disk.
- 2) Use the DOS COPY function to copy the disks to the new sub-directory.
- 3) Use the Searching-Order command to insert the new sub-directory into your volume search table.

For the novice, 1 and 2 need more information, while 3 had me completely baffled, and looking for the Searching-Order command in the index revealed nothing. I eventually found a reference to it in the Utilities-Desk Accessories manual.

Both programs have installation problems. Lotus seem to think they have done us a great service in Release 2.01 by allowing us to install it on a hard disk without requiring a diskette in drive A. This overlooks the need for hard disk backup, which is an essential part of using a hard disk. Personally, I'm getting close to the stage of refusing to use copy-protected software.

Open Access seems to be unsure whether its installation instructions are for novices or experts. Unless you are an expert or enjoy solving puzzles, get your dealer to install it for you.

How Big's Your Disk?

Lotus 1-2-3 is a large program; fully installed it requires about 1.5 Megabyte (2.2 Mbyte if you include HAL), whereas Open Access occupies just under 1 Mbyte. Also, to print graphs from 1-2-3 you need to exit the main program and enter PrintGraph.

Then, if you discover something wrong with the graph you have to return to 1-2-3 and repeat the process. Open Access uses a single program for spreadsheet and graphing.

For testing, I used a small spreadsheet consisting of 10 columns and 10 rows, with each cell dependent on the one before it. The file occupied 4,326 bytes in 1-2-3 and 11,264 in Open Access, but this difference will not necessarily apply to larger spreadsheets.

Both programs need 256 kilobytes of RAM, but they use this memory quite differently — Lotus loads the program and the spreadsheet into memory and keeps them there while you work on the spreadsheet. This makes for fast operation at the expense of imposing a limit on the size of the spreadsheet. Add HAL, and even with 640 Kbytes, the size of your spreadsheet is quite small. To overcome this restriction the MIL (Microsoft Intel Lotus) EMS (Expanded Memory Specification) system was devised. Under this system, 1-2-3 can use up to 4 Mbytes of memory beyond the 640 Kbytes limit. Memory boards are available to give you extra memory, and come with software to enable you to take advantage of it.

Using expanded memory does slow the system down somewhat, and is handled by Lotus in a peculiar manner, with some of the spreadsheet held in normal memory and some in expanded memory.

Memory keeps getting cheaper, but it still adds considerably to the cost of a system, and EMS is really only a stop-gap until an operating system capable of accessing more than 640 Kbytes becomes available.

Open Access uses virtual memory. This way, when the spreadsheet becomes too

large to fit in memory, some of it is passed back to the disk, and 'parts' are swapped in and out as required. Effectively, this means that the spreadsheet size and capacity are not limited by the amount of memory in your computer. Open Access claims a maximum spreadsheet size of 216 columns and 3000 rows (648,000 cells). The trade-off is speed; disk access is slower than accessing RAM.

Graphs

Although 1-2-3 makes workmanlike (work-personlike?) graphs, they are not very inspiring; it provides for line, bar, X/Y, stacked bar graphs, and pie charts. To these basics, Open Access adds 3D and surface graphs — both of which are stunning, and far in advance of what 1-2-3 can do on its own. Open Access also allows sizing, editing and rotation of the graphics display.

An extra feature of Open Access is the Graphs Slides command, which allows you to create a 'slide show' from a series of graphic 'slides' which are collected into a 'carousel'. Macros allow you to specify how long a slide will be displayed; the default is 10 seconds, but this can be extended to more than 15 minutes. Up to 32 slides can be included in a carousel.

Comparing the functions available in each program is a tedious task, as both programs have an extensive list. For general use, either one should be adequate, although specialized users would be advised to check whether any particular function they want is available.

Both programs include mathematical, statistical, financial and date functions, although only 1-2-3 has string functions. Many functions bear the same name in each program, and the ones that don't have names are self-explanatory. ▶

Product Details

Product:	Lotus 1-2-3 Release 2.01
From:	Lotus Development Corporation
Distributor:	Imagineering 77 Dunning Ave Rosebery NSW 2018 (02) 697 8666
Price:	\$1095 \$334 additional for Lotus HAL

Product:	Open Access II
From:	Software Products International
Distributor:	Software Suppliers 7 Avon Rd North Ryde NSW 2113 (02) 888 1955
Price:	\$449 Open Access II with Desk Accessories \$880 with Graphics, Word Processing, Database and Communications

One of the features of Open Access is a goal-seeking command — specify your goal (target) for one or more variables, and let the program calculate the necessary variables to achieve those goals. 'What if' calculations can be done in both programs.

When 1-2-3 first appeared, it set the standard for menu systems: a line of commands is spelled out in plain English and they can be chosen by pressing Enter, or by pressing the first letter of the command. When a function is highlighted, a more detailed explanation of the command appears on the line below.

A difficulty with this sort of menu is that each command must start with a different letter, although Lotus were able to do this without contorting the language too much. They did it by limiting the number of choices in each menu to eight, although in the latest release the first menu has been extended to 10 choices.

Having a limited number of choices leads to a lot of sub-menus and sub-sub-menus and it's easy to become lost in the somewhat convoluted paths of 1-2-3. However in 1-2-3 you can always be sure that pressing Enter moves you further into the menu structure, while Esc allows you to back out step by step.

The approach taken by Open Access is different; more commands in each menu and less of an effort to make the first letters different. As an example, refer to the opening Spreadsheet Command Selection Menu in Figure 3.

In selecting from this menu you can enter just enough of each command to make it unique; thus C for Copy is enough, while for Exit/save you need to enter EX.

Switching from 1-2-3 to Open Access takes a little getting used to. The main keys in Open Access are —

<do> <F10>
<undo> <Esc>
<help> <F1>
<menu> <F2>

I guess it is just a question of what other programs you use; if you use the other modules of Open Access, the choice of keys is just as logical as any other.

Macros are like a simple programming language available inside the spreadsheet. Both programs support their use, although the examples given by Open Access are somewhat brief.

Auto	Blank	Copy	Delete	Edit	Exit/Save	Format
Goal_Seek	Graph	Insert	Locate	Name	Order	Query
Recalc	Setup	Table	Transfer	Update	Window	Xternal

Figure 2. The opening Spreadsheet Command Selection menu in Open Access lists a large number of commands, obviating the need for sub-sub-menus.

The Real World

Rob Knights is someone who has used both programs extensively. His experience with spreadsheets goes back to using PerfectCalc on an Apple, followed by Lotus 1-2-3 and Open Access. His work requires six PCs running some 330 different spreadsheets, making extensive use of databases and big external looping macros.

He is converting his 1-2-3 programs to Open Access, as he has found that it is more suitable for his particular application, which includes many consolidations. Also, Open Access makes better use of his hard disks; spreadsheets stored in compressed form in Open Access take 6 Mbyte against 15 or 16 Mbyte in Lotus. Using compression has had little affect on retrieval time.

Conclusions

Comparing the leaders in any category is usually inconclusive because their similarities are more apparent than their differences. In the world of PC spreadsheets there is little to choose from besides Lotus 1-2-3, Open Access and SuperCalc. All have gone through several revisions and most of the bugs have been taken out.

Making a choice is very much a matter of personal likes and dislikes.

Lotus 1-2-3 has a unique capability in HAL, but it also has an obnoxious copy protection scheme. Big spreadsheets can be used, but only if you can afford the extra memory. With Open Access you can get by with less memory, but at the expense of speed. To get high quality graphics from 1-2-3 you need its own two programs (PrintGraph is the second one) plus an extra presentation graphics program.

Open Access does it all in the one program and tosses in a Desk Accessories program for nothing but lacks really good documentation. Certainly as Rob Knights says, both are 'ridiculously cheap'.

What of the future? Lotus has already announced they are working on Release 3 of 1-2-3 to run under the new operating systems, but I wouldn't hold my breath waiting for it, nor would I like to see repeated the disaster of Release 2. Open Access has built up a solid user base, and looks like staying around long enough to produce their third release. In the mean time, you can hardly go wrong with either program. □

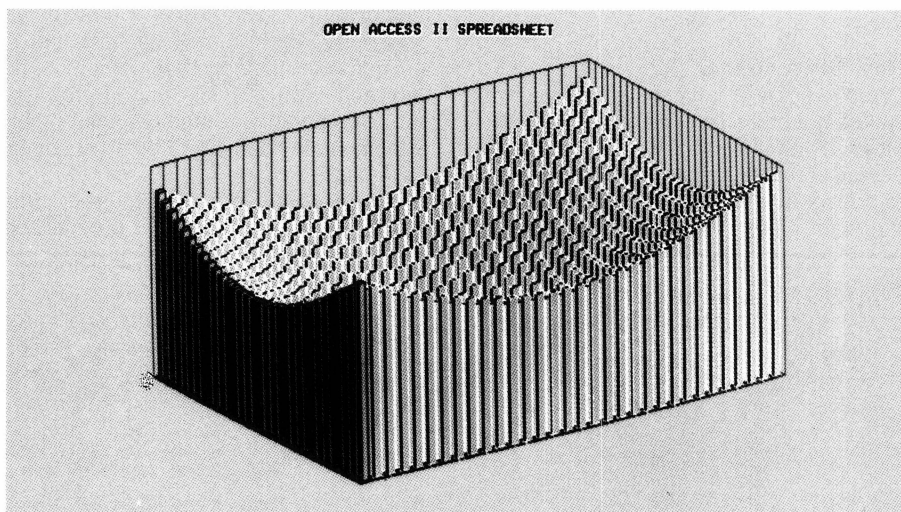


Figure 3. As well as offering three dimensional and surface graphs, Open Access allows sizing, editing and rotation of the graphs.

Zoom Boards

*Breathe New Life
into that Lazy
Old PC!*

*Getting old and weary
while waiting for your
computer to recalculate a
spreadsheet? Thinking of
calling the the undertakers
to remove that expired
operator (is he still waiting
for the compiler?). Then,
let Peter Feldtmann tell
you about Z-o-o-o-m
Boards . . .*

In the case of machines such as the Tandy 1000, however, you're out of luck — the space provided for such cards is too short.

The user's guide is a small ring-bound manual covering every aspect of the board's technical specifications as well as giving full details on hardware and software installation. There is also a section covering operation, a reference section and a number of appendices. A well written and informative manual is a rare thing (even if it is a ring binder), and this one stands as a fine example for others to follow.

Installing your average accelerator board in a PC is definitely not a task for the hamfisted or fearful. Here is the usual procedure —

- 1) Turn the power off. Remove the 8088 processor chip from its socket on the motherboard with a small flat screwdriver or a special extraction tool. (Take care not to damage the board or the socket.)
- 2) Remove the adapter bracket (which protects the innards from deadly dust) by undoing the retaining screw and sliding the little fellow out, then fit the accelerator in the vacant slot.
- 3) Fasten the accelerator to the chassis with the screw gained in Step 2. (What, no screw? Look on the carpet.)

4) Attach the small extender cable which runs from the accelerator to the vacant 8088 socket.

5) Have a stiff drink and turn on the power. If no smoke emanates from the computer, you may be in business.

Installing the Orchid PC-Turbo 286e, however, is a piece of cake — as the board uses the 8088 chip, there is no need to remove it. That means less chance of damage either to the chip, the board or your liver. It is also necessary to select several options via jumpers on the board, including the I/O address which the board occupies, the interrupt request line and the 80287 speed setting, if required.

Because speed selection for the 286e is set from the software, the next step is to install the drivers which control the system configuration. This procedure is entirely painless, as the software prompts for the required information.

The Orchid PC-Turbo 286e is fast.

F-a-s-t! In his naked state, Zebbie runs at the same 4.77 MHz rate as Big Blue's Slug and that's by no means startling. With the 286e struttin' its stuff in there — Superman eat your heart out!

The RAM on the 286e is what sets this board apart. This memory may be configured as DOS memory, Protected memory,

WHAT'S A ZOOM Board? More conventionally known as an accelerator card, a Zoom Board is a bunch of electronic gismos that give your machine the speed of an IBM AT or better. While the standard PC operates at a clock speed of 4.77 MHz and the PC-AT rolls along at 6.77 MHz, these boards can whack you up to 8 MHz or even more using an 80286 chip.

I plugged several Zoom Boards (one at a time) into old Zebediah to see the cobwebs clear. They did!

PC-Turbo 286e

The Orchid PC-Turbo 286e is an accelerator board and RAM pack for the IBM PC-XT range of computers and *most* true compatibles. The package consists of the 286e board itself (this is a full length board), the installation software and a user's guide. The standard RAM configuration is 1 Mbyte, but an additional 1Mb of RAM may be added at any time. You need real IBM expansion slots to utilise this board.

Product Details

Product:	PC-Turbo 286e and Tiny Turbo 286
From:	Orchid Technology Fremont, California
Distributed by:	Porchester Computers PO Box 1193 St Kilda South 3128 (03) 537-2722
Price:	\$2365 Turbo 286e \$1235 Tiny Turbo

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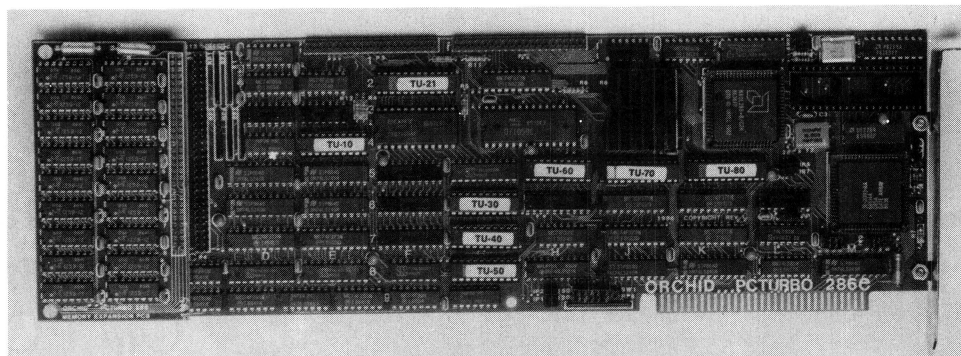


Figure 1. The RAM on Orchid's PC-Turbo 286e can be configured as DOS memory, Protected memory, or EMS for programs like Lotus 1-2-3. With the addition of the optional 1 Mb RAM daughtercard, the system will make 2 Mb of RAM available to DOS, or it may be configured for EMS.

or EMS for programs like Lotus 1-2-3. With the addition of the optional 1 Mb RAM daughtercard, the system will make 2 Mb of RAM available to DOS, or it may be configured for EMS. This is quite a lot of memory for the average program to get lost in. The standard RAM already in the computer may be used for print spooling, disk cache, or as a RAM disk. Up to four 286e boards may reside in the computer, giving you multiprocessor capabilities — provided the power supply and ventilation can cope since these boards chew up 13 watts (2.75 amps at 12 volts) each.

If you use your computer chiefly for word processing, then this card is not for you — unless you can type at 3000 wpm, you won't notice any major enhancement. It is in applications such as spreadsheets, other processor-intensive programs and programming, that the benefits will become evident. That 80286 running at 8 MHz with no wait states speeds things up considerably!

Tiny Turbo 286

The Orchid Tiny Turbo 286 is more representative of the other accelerators on the market: the package consists of a short card (designed to fit into the short slot on the IBM-XT), a short 40-way cable 3 inches long and a simple user's guide. No software is provided with this card, as switching between the 8088 and the 80286 is accomplished with a switch on the board — UP for the 80286 (and a brisk 7.2 MHz), and DOWN for the faithful old 8088.

Installation is fairly straightforward, comprising the steps outlined above (not forgetting the stiff drinky). Dip switches are used to pass information to the Tiny Turbo about the host system's RAM configuration. According to the manual, it is preferable to install the board into slot 7 of the IBM rather than slot 8, which was originally designed for expansion of the main bus. Installing the board in slot 7, however, is something of a problem because of the very short cable — only 3 inches. This means that the cable must lie across slot 8, which effectively puts that slot out of action.

The suppliers provide an optional longer cable (15 inches) for computers which have the 8088 processor elsewhere on the motherboard. The Compaq XT, for example, requires this cable, as do some

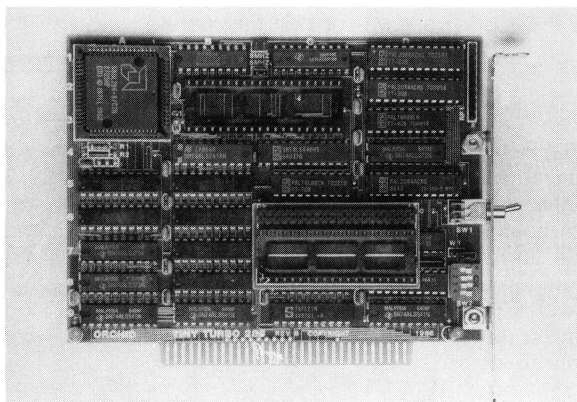


Figure 2. Orchid suggest installing the Tiny Turbo 286 in slot 7 of the IBM — but the supplied cable is so short that this effectively puts slot 8 out of action. (If you can resolve the I/O conflicts with a jumper on the main board, it's possible to instal it in slot 8.)

Zoom Boards

of the more exotic Asian clones. If you choose to install your card in slot 7 on a true blue IBM, then get the longer cable — it will run over the top of whatever card is in residence in slot 8. The package also contains a 'Readme Sheet', which details possible I/O address conflicts if the board is installed in slot 8. These conflicts may be resolved with a jumper on the main board. But if all else fails, use slot 7.

The manual is by far the stingiest I have seen for any add-on currently available. It consists of a mere 12 pages of text stapled together into a small booklet — it's reminiscent of hastily assembled errata sheets. However, despite its lack of glossy cover, spiral binding, index or appendices, I found the user's manual still had all the information necessary to install and use the board.

Hyperace 286

The Hyperace 286 package consists of the 286 card, the ever-present *short* cable, installation and speed selection software and a user's manual covering both the 286 and the 286 Plus. Surprisingly, this board dispenses with the 8088 processor entirely — when accessing the 8088 via software, it places the 80286 into 8088 emulation mode!

Installing the board is again the heart-in-mouth procedure of extracting the 8088 processor and replacing it with the 3 inch cable, then inserting the board into slot 8. Once this is achieved, the next step is to install the software. Software installation is a simple menu-driven task — or so the manual would have it.

Certain aspects of this process seem arcane to say the least: normally, installation of this type of software offers the opportunity of selecting a key to invoke the menu — Alt-Z, for example. The Hyperace 286 installation, however, uses Alt-224, which I took at first to be a long-winded way of entering an ASCII code. It is to be taken literally, however — Alt-224 really does invoke the menu. Another problem — although the manual explains how to select the key sequence during installation, finding this explanation took almost an hour of diligent research.

Once installation is complete you are ready to fly. Or crawl — I had to run the benchmarks a number of times to confirm the results.

As I suggested earlier, the manual leaves something to be desired (as well as

a great deal to the imagination — considerable prior knowledge is assumed). It comes as a shiny, spiral-bound booklet of slightly over 30 pages and is rather scant on technical details such as power consumption (this is an issue of some importance for overstuffed PCs). The standard of writing is not all it might be — every topic requires several readings to get the gist.

In Turbo mode, the board worked satisfactorily and sped Zebbie along rather nicely. Somewhat disappointing, on the other hand, was the performance of the card in PC-speed mode, as the benchmarks indicate. This is the first instance I have come across of an accelerator card which is actually slower than the original 8088 while in emulation mode.

Hyperace 286 Plus

The Hyperace 286 Plus comes packaged identically to its little brother, the 286 — it has the same box, the same manual and is installed according to exactly the same procedure. The only major difference is the clock speed for the processor — 10 MHz. This again is a short card which requires the 3 inch cable connection to the PC motherboard. As the benchmarks show, there is a greater speed enhancement with the Hyperace 286 Plus; and in PC-emulation mode, it shares its little brother's curious ability to slow the computer down. The manufacturers recommend placing both these cards in slot 8, which will alleviate some of the difficulties met installing a card like the Tiny Turbo 286 in slot 7.

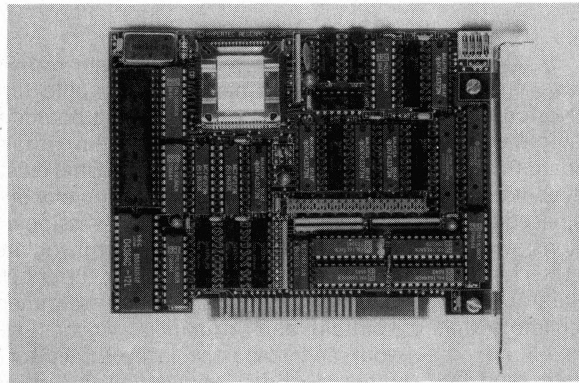


Figure 3. *Hypertec's Hyperace 286 dispenses with the 8088 processor entirely — when accessing the 8088 via software, it places the 80286 in emulation mode!*

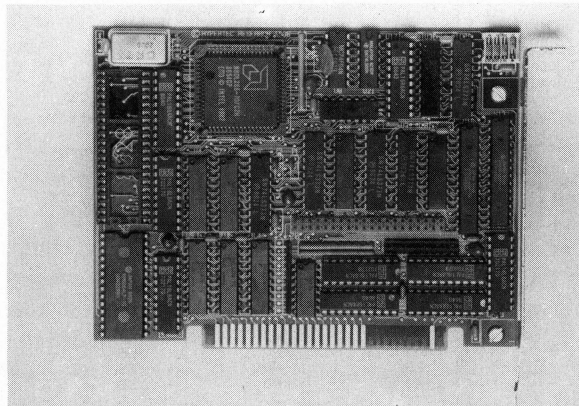


Figure 4. *Hypertec's 10 MHz 286 Plus shares its little brother's curious ability to slow the computer down when in 8088 emulation mode.*

Product Details

Product:	Hyperace 286 and 286 Plus
From:	Hypertec Pty Ltd
Distributed by:	Hypertec Pty Ltd PO Box 385 Drummoyne 2047 NSW (02) 819-7222
Price:	\$1279 Hyperace 286 \$1365 Hyperace 286 Plus

Zoom Boards

Now for the Fun!

Now for the fun part — have a look at Table 1. Did you notice the Norton SI ratings and how little relationship they bear to the actual speed of the boards? This is due in part to the way SI does its speed calculation — SI, I believe, is based on 100 percent clock-bound operations, which is why the rating is so close to the clock rate on the board. On any accelerator, speed overall is governed by much more than mere clock rate.

Other factors like wait states and bus width must also be taken into account. In view of these factors, I have included a corrected relative speed factor (CRS) in the Table. This is calculated from all the results and provides a more realistic value. Next time you are impressed by an SI rating — be warned: it's not a very accurate measure.

Hurry, Hurry, Hurry! Step right up and get your ZOOM BOARDS while they're hot! You, sir — yes, you over there! — come and get one of our latest and greatest accelerator boards for your weary old PC. Faster than your average AT at a fraction of the cost!

Should you really step right up? Since purchasing a new IBM AT would further eat into the mortgage, these boards may be of interest. But with the current rash of 8 to 10 MHz AT clones on the market starting at around \$1600 would you buy one? If you already have in your possession a real IBM PC (seen one lately?); or if you are: a) particularly attached to your current clone and can't part with it for sentimental, spiritual, and/or financial reasons, yet b) you can't stand the lack of pace for another clock tick and c) you are on good terms with your bank manager — then the answer must be YES. And while you're at it, buy me one — Zebbie and I have seen many a slow sun rise.

For pure productivity, these boards are perhaps the only way to go, without cluttering up the desk with yet another computer. But there are a number of other options, if all you want is certain types of speed improvement. There are RAM disks, print spoolers, disk cache programs, keyboard and screen enhancers — any of which (at the expense of some RAM) will give you quite considerable speed improvement. Above board and EMS RAM

cards are available if all the above-mentioned software enhancers have devoured your RAM. With the exception of the RAM boards, these products are quite a lot cheaper — on the order of \$100 to \$200 — and they may be just the ticket.

Which one to buy? Well, the choice is yours — All the boards offer greatly improved performance over a naked PC. Does the computer wait for you? And if so, how much time does it spend waiting? How much time do you spend waiting for your computer? Then —

```
IF computer waiting time > your waiting time.
THEN
    forget it or learn to type.
ELSE
    IF time is money and can be recouped with speed.
    THEN
        buy a ZOOM BOARD or an AT.
```

In general, I wouldn't mind any of them taking up residence in Zebbie. I particularly like the Orchid 286e, as it was by far the easiest to install (don't like the price, though) and the fastest. If I never wanted PC speed again I would choose the Hyperace 286 Plus, as it has the best price to performance ratio of the boards tested here — and it didn't take up too much room. □

	AT Zebbie PC			Orchid Turbo				Hyperace			
				286e				286		286 plus	
Price	-	-	-	2365.00		1235.00		1279.00		1365.00	
HARDWARE											
Processor	8088	8088	80286	80286		80286		80286		80286	
Clock Speed	6.77	8.00	4.77	8 Mhz		7.2 Mhz		6 Mhz		10 Mhz	
8087	Opt	Opt	Opt	Opt		Opt		Opt		Opt	
Board Size	-	-	-	Full Length		Half Card		Half Card		Half Card	
Power Cons.	-	-	-	13 Watts		7 Watts		5-7 Watt		5-7 Watt	
Speed Change	-	-	-	Software		Hardware		Software		Software	
Par. Process Ability	-	-	-	YES		NO		NO		NO	
Standard RAM	-	-	-	1 Mb		Cache		Cache		Cache	
Maximum RAM	-	-	-	2 Mb		n.a.		n.a.		n.a.	
Wait States	-	-	-	None		n.a.		n.a.		n.a.	
Mem. Config.	-	-	-	See Text		n.a.		n.a.		n.a.	
SOFTWARE											
Mem. Resident Driver	-	-	-	NO		NO		YES		YES	
Install prog.	-	-	-	YES		NO		YES		YES	
Special Progs	-	-	-	YES		NO		YES		YES	
BENCHMARKS All timing in seconds											
Turbo mode											
				ON	OFF	ON	OFF	ON	OFF	ON	OFF
Disk Write	16	24	37	10	37	17	37	19	46	14	41
Disk Read	12	20	31	8	31	13	31	16	39	11	35
Calcs	36	61	96	15	96	35	96	38	128	26	112
Sieve	117	195	306	49	306	111	306	118	417	85	366
Compile/Link	40	73	100	38	100	57	100	57	133	50	121
Total Time	221	373	570	120	570	233	570	248	763	186	675
Norton SI	5.7	1.5	1.0	9.2	1.0	6.6	1.0	6.6	1.7*	10.3	1.9*
CSR #	2.6	1.5	1.0	4.75	1.0	2.4	1.0	2.3	0.7	3.1	0.8

* Note: Corrected Speed Rating (see text)

* Note: These are absolutely wrong

Table 1. All times in the table are given in seconds, and the tests were run in PC speed and Turbo speed modes. The Disk Write, Disk Read, Calcs and Sieve of Eratosthenes programs were all written in standard GWBASIC. The Compile and Link process was performed using Computer Innovations C86 compiler and Microsoft's overlay linker with no special switches on a C source file of 4600 bytes.

MTBasic

MultiTasking Basic!

*Multitasking, windowing,
interactive, handles
interrupts, fast native code,
compiles quickly, floating
point, no runtime fee —
that's the Basic Compiler
Greg Bradley found!
You'd better read on ...*

ALL THOSE FEATURES sure sounded interesting when I read about MTBasic in *Dr Dobb's Journal*. Plus, it runs Byte's Sieve in 26 seconds (1400 seconds for interpreters), and can have 10 basic routines running at the same time, while displaying 10 separate windows; MTBasic compiles 100 lines of code in 1 second, and it's available for CP/M or MS-DOS. What more could you ask for in a Basic Compiler I says to myself — so off went my cash and the program duly turned up.

Well what did I get for my money? Exactly what it says above — and MTBasic is now available in Australia.

If you're after a program to compile all your Microsoft Basic programs without any effort, forget it. By no stretch of the imagination is this program Microsoft compatible, but then it never claims to be. Nor is it much like any other Basic you care to name, but what others are multitasking?

Multitasking

MTBasic can run up to ten different tasks (each separate activity is called a task) at once and it does it well. On my CP/M version, two tasks produce barely any appreciable drop in speed (as you'd expect, the drop in speed with ten running is quite noticeable, but then, I've only ever run this many tasks at once just to see it done).

'My computer doesn't have hardware interrupts so it can't work,' you say? Well, neither does mine — The program gets

around this by creating its own software interrupts (it calls them tics and so will I). Tics are used to tell the computer when to stop working on one task and to start the next. If you want one task to run faster than another, then you simply specify a higher number of tics for it to run before switching to the next task. Here is a typical demo program out of the handbook —

```
20 RUN 1,100 :REM DO TASK 1 FOR 100 TICS
30 RUN 2,100 :REM DO TASK 2 FOR 100 TICS
40 PRINT 0
50 GOTO 40 :REM CAN'T END LEAD TASK
60 TASK 1 :REM TASK1 STARTS HERE
70 PRINT 1
80 GOTO 70 :REM TASK1 DOESN'T END
90 TASK 2 :REM TASK2 STARTS HERE
100 PRINT 2
110 GOTO 100 :REM TASK2 DOESN'T END
```

As you can see, you run each task simply by saying RUN Task *n*, How Long. Note that goto's are used to prevent each task running into the next. It is also possible to have each task run once and then switch by ending them with EXIT. The task runs again next time its tic comes up (useful, say, to monitor a lock-up alarm tag without wasting time running the task concurrently all the time). The first four lines of the program are the lead task. This must never end (contain an EXIT or STOP command) or else, obviously, all tasks stop. It can contain a wait (for *x* tics) command, though. If you aren't using multitasking, your program consists of the lead task only. The example runs each task in turn for 100 tics, and then continues running the lead task until stopped.

Windowing

You can set up rectangular windows anywhere on the screen. A trap for the unwary here — If you select a 40 character wide screen, and a 40 character wide window

and then write 80 character wide text to it, you'll only see 40 characters under DOS. Not a real problem, but it made me scratch my head for a while when I compiled one of my old CP/M programs under DOS. The windows themselves are as easy as pie to set up: simply provide the upper lefthand and lower right hand corners and *presto!* Whoops — we forgot to give it a number first, otherwise how else can MTBasic tell one window from another? If you want to save the contents of the window before you close it —

```
10 INTEGER T(1000) :REM ARRAY TO SAVE SCREEN
20 WSELECT 1 :REM ASSIGN WINDOW NUMBER
30 WINDOW 0,0,23,79 :REM CREATE A WINDOW
40 WSAVE T(1) :REM SAVE CONTENTS
50 ERASE :REM OR CLS TO CLEAR SCREEN
:WCLEAR FOR WINDOW ONLY
60 WUPDATE :REM WRITE IT ALL BACK
```

Note: WUPDATE doesn't work on any IBM clone I've tried it on without using the CLONE command (more of which later).

There is a command for putting a frame around your window as well, but remember that the frame is part of the window so if you don't want to overwrite it, you must specify another window to write to inside the frame —

```
10 WSELECT 1 :REM NAME WINDOW
20 WINDOW 5,5,15,40 :REM SIZE IT
30 WFRAME " ", "I" :REM OR USE CHR$(X) TO FRAME
40 WINDOW 6,6,14,39 :REM WINDOW TO WRITE TO
```

Interactive

While writing and debugging your ultimate program, most compilers would drive you mad: write, compile, debug, compile, debug, compile... With MTBasic, it's just a matter of loading it and then entering your program. If you want to see how it works, say RUN and off it goes. If it doesn't work properly simply enter your changes and run it again. Once

Product Details

Product:	MTBasic
From:	Softaid Inc Columbia Maryland USA
Review Copy From:	Baltec Systems 26 Main View St Milton Qld. 4064 (07) 369 5900
Distributor:	IED Microprocessors 7/5 Chandler Rd Boronia Vic. 3155 (03) 762 3588
Price:	\$125 MS-DOS and CP/M Versions \$160 8087 Version

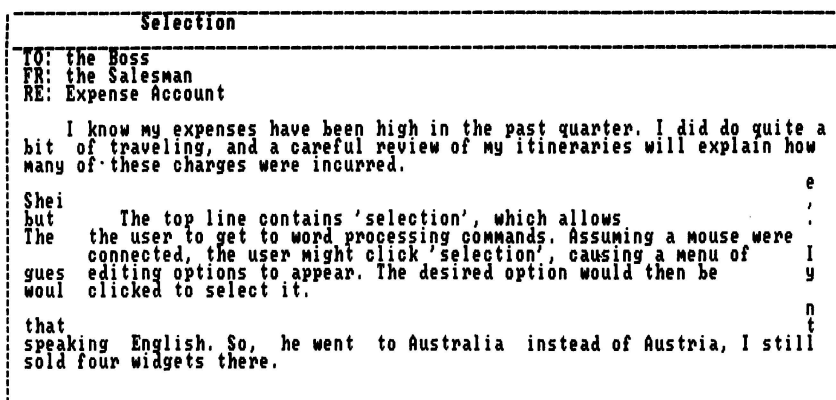


Figure 1. Note the unframed Selection Help window in the centre of the screen — rectangular windows can be set up anywhere on the screen simply by entering the top left and lower right corners — and there it is. The windows can be also be framed.

it's finally debugged, say DISK COMPILE {NAME} and you have a standalone COM file. So what, you say, you can do that by having a compiler that's compatible with your interpreter. But does your interpreter run at machine code speed? This can be important if you're writing multitasking or any timing dependent program (communications?).

Interrupts

As we saw, while discussing multitasking, MTBasic uses interrupts for the tics; this isn't the only way it can use interrupts though. INTMODE and IVECTOR are used in CP/M systems — INTMODE sets the level of interrupt: 0 places the first byte of the instruction on the address bus with the following bytes read by normal memory reading sequence; 1 executes a call to location \$0038; 2 allows an indirect call to anywhere in memory. VECTOR works like IVECTOR level 2 interrupts for both MS-DOS and CP/M (MS-DOS only supports level 2).

Fast Native Code

There isn't much I can say about the native code bit. The only thing I can whinge about is the size of the overhead, and there are ways provided for reducing this. An option to produce an assembler compatible file to allow optimisation would be nice, but we can't have everything, and, anyway, most users wouldn't want to fiddle with machine code at all (otherwise why buy a compiler). If you're masochistic enough to want to dabble in machine code, you can also include it in your program using the code command. If you do choose to do this, you must convert it to the numeric equivalent first —

for example, CODE \$21.0.0 (\$ indicates that the following value is hexadecimal). All code is completely ROMable as well (for CP/M it runs from 100H, for MS-DOS, at any 64K boundary).

Compiles Quickly?

It sure does! In interactive mode, the only way you know you're using a compiler, is the speed of the program execution. On really long programs there is a perceptible delay after the RUN command before the program executes, but certainly not an objectionable wait.

Floating Point

Well, yes, you do have floating point but it isn't as accurate as some other Basics. MTBasic uses 32-bit, IEEE compatible representation of real numbers giving about 6.5 significant figures, whereas other Basics often use 64-bit representations which give a high accuracy, but chew up twice the memory and slow down operations considerably. If you have an MS-DOS system and you really want high accuracy, then you can always buy the

8087 version of this program, but remember that programs compiled for 8087 equipped computers won't run on machines without it. This version (8087) has 18 significant figures and a real number range of +/- 10**308.

No Runtime Fee

Many software companies require the payment to them of a fee for every program written using their language that you later wish to sell. Personally, I reckon this is a bit rude — they usually charge through the nose for the program in the first place and then they want a second bite of the bicky! I'm glad to say that Softaid only require an inclusion in the compiled program which gives them credit for having written the compiler.

That covers all the promised features of MTBasic, what else does it do? MTBasic has a lot of the features of Pascal. Any Pascal programmer would recognise commands like CONCAT\$ for joining strings, the requirement to declare all variables before use (all variables in MTBasic are global and must be declared before any executable code is used), and recursion. For instance, if you wanted to find a factorial (everyone seems to pick this to demonstrate recursion so why should I be different) you would do it as follows —

```
10 REAL A :REM Define variables
20 INTEGER I:REM Factorials are only on
               integers
30 INPUT I :REM Factorial what?
40 A=1.0 :REM Note the decimal denotes real
100 A=A*I :REM Result real because var real
110 I=I-1 :REM Next factorial
120 IF I=0 THEN 140:REM Finished?
130 GOSUB 100:REM Not finished? well loop
140 PRINT A :REM Print result
150 STOP :REM Finished
```

Most of the other features of Basic as we know it are also available — the functions and statements available are given in Table 1. You will probably recognise most of the commands in the Table, but some

Functions —							
ACOS	ADR	ASC	ASIN	ATAN	BAND	BOR	BXOR
CHR\$	CONCAT\$	COS	CSEG	CVI	CVS	DAT\$	ERR
ERR\$	EXP	GET	INP	KEY	LEN	LOF	LOG
MID\$	MK1\$	MKS\$	MOD	PEEK	RND	SIN	SQR
STR\$	TAN	TIME\$	VAL				
Statements —							
CALL	CANCEL	CHAIN	CIRCLE	CLOSE	CLS	CODE	COLOR
CURSOR	DATA	DEF	DEFSEG	DELETE	ERASE	EXIT	FIELD
FILE	FNEND	FOR-NEXT	FPRINT	GOSUB	GOTO	IF	
INPUT	INPUT\$	INTEGER	INTMODE	INTON	INTOFF	IVECTOR	LINE
LPRINT	MCALL	NEXT	OFFERROR	ONERROR	ON:GOSUB	ON:GOSUB	
ON.GOTO	OPEN	OUT	PAINT	PAUSE	POKE	PRESET	
PRINT	PSET	PUT	RANDOMIZE	READ	REAL	REM	
RETURN	RGET	RUN	SCREEN	SEEK	STOP	STRING	TASK
TRACEON	TRACEOFF	VECTOR	WAIT	WCLEAR	WFRAME		
WINDOW	USAVE	WSELECT	WUPDATE				

Table 1. MTBasic has most of the features of Basic as we've always known it — and a few extra.

you might not (note that CP/M versions don't have graphics). The bit comparison and graphics are fairly obvious, but the file handling may require a bit of explanation. MTBasic doesn't allow random files. However, random access of sequential files is possible using the SEEK command which positions the file pointer to the relevant record (128 bytes unless otherwise specified with field). If the field is used, then the commands PUT and RGET must be used as the more usual PRINT and INPUT commands will not work.

If you have an MS-DOS machine, the CLONE statement has the effect of disabling the graphics and window scrolling. The problem with using this to prevent unwanted scrolling when using the WUPDATE command, is that there is no way to turn it off. You can, of course, write your program in modules using CLONE for windows and not using it for graphics, and then chain them together, but this wastes lots of disk space and slows everything down something awful (all that disk ac-

cessing!). Anyway, it doesn't help with graphics windows. All is not lost — simply make your window one line longer before you WUPDATE and then declare it again using the correct size. The other option is to buy a later version of PC-DOS (Version 3 or later, according to the manual), although it doesn't work with my Falcon MS-DOS V3.1.

Bugs

Apart from the problem with the window scrolling I mentioned above, the only other bug I could find was a problem with the LINE command. On occasion it comes up with a divide overflow error when used on my machine (I haven't had a chance to try it on a real IBM yet — most of my mates with a clone either have the same breed as me or don't have a colour card fitted). I reported this to my dealer, Baltec, who contacted Softaid through JED, the distributor — they have asked for listings so they can fix any problems in future releases.

This brings me to Softaid's update policy. My early CP/M version of MTBasic doesn't have the line editor, amongst other improvements, and also has the annoying habit of simply deleting any lines from the source which contain commands it doesn't know. I probably won't bother updating it now because I'm moving into MS-DOS more these days; besides, I can always use my MS-DOS version for writing the program and simply copy it over to the CP/M disk to compile if I want a CP/M version. It is good to know, though, that I can update either version whenever one comes out. Softaid in the States and JED here in Australia, will update your disk to the latest version simply by returning it with \$30 to JED.

What do I think of the program? Well I won't be erasing all copies of the review disk because I won't be returning the review disk — I intend buying it and if that isn't a recommendation, I don't know what is! □

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First Choice

for the budget-minded home-user

First Choice combines a simple wordprocessor, database, spreadsheet and communications program. John Hepworth found it's a simple answer to the home-user's dilemma: 'What software should I buy?.'

YOU KNOW about computers don't you? Can you tell me if I should get a home computer, what I would use it for and which one should I buy? A dollar for each time I've been asked those questions and I could retire to a tropical island and a life of luxury! After going past the obvious situation ('I want something the kids can use'), and recommending buying the machine the kids use at school, we get to talk to the adult who needs a simple word processor and database, and may need a spreadsheet and communications program.

The hardware recommendation then solves itself — a PC or compatible. If the budget will stand it, a hard disk as well. The software? Until now this has always been difficult to answer. For someone planning to use the system in business, it's easy to recommend industry standard packages like Lotus 1-2-3, Microsoft Word and dBASE III.

Not so for home users, who will reel in shock at the thought of spending an amount on software which could be greater than the hardware investment. At the same time they may have a real prob-

lem with learning applications far more powerful and complicated than they will ever need.

If the potential user has an inquiring mind, one solution is Public Domain alternatives like PC-Write, PC-Calc, PC-File and PC-Talk. These are excellent value, and very powerful, but they don't have consistent user interfaces and transferring data from one to the other isn't easy. Thus they are not ideal for many novices.

First Choice has given me the solution when the next enquiry comes from a novice with limited aspirations. It's a package combining a simple word processor, database, spreadsheet and communications, and allows the user to seamlessly move from module to module with a consistent user interface and to transfer data from one module to another.

Starting Up

First Choice comes on two disks — marked as the program disk and the dictionary disk. Included on the dictionary disk are some sample documents, file folders (databases), report formats and spreadsheets. The manual, sensibly, has detailed instructions for backup of the distribution disks; instructions for installation on a hard disk are given in an appendix, which is referred to on the first page of the Quick Tour section at the beginning of the manual.

Placing the program disk in drive A and the dictionary disk in drive B (this program really needs 2 disk drives or a hard disk — one drive is just not enough), type FIRST. The program loads and the first menu appears, with a number of choices allowing one to create a document, database, spreadsheet or report, to get an existing document, spreadsheet, report or database, or to connect to another computer. Also available from this menu is the hard disk install routine and the ability to reset program defaults like the screen colours.

The Word Processor

From the first menu we can enter the Word Processor either by choosing to create a new document or get an existing one. The screen simulates a page. The cursor is located down from the top and in from the left simulating the top and left margins. At the bottom is a ruler line, with a marker showing the current cursor location, the default margins (which the user can reset) and the tabs.

At the top is shown the name of the file being edited and the percentage of the available file already used. Maximum document size is about 60k, but several files can be joined end to end at print time with continuous page numbering. Also shown is the line and page number of the printed output where the cursor is located. As text is entered, and a page break is reached, a double line is drawn across the text with blank lines above and below simulating the bottom and top margins.

First Choice is designed to emulate as far as possible, within the word processor, using a typewriter. Top, bottom, left and right margins are shown on the screen and it defaults to overwrite mode. Pressing a key replaces the character under the cursor with the one just pressed. Pressing the Ins key toggles to and from insert mode. Paragraphs automatically reformat as text is added or removed.

The dictionary works reasonably well, and with adequate speed for typical file sizes. When an unknown spelling is encountered the checking stops and alternative spellings are suggested if available. Unfortunately a soundex or 'sounds like' algorithm is not employed, and the alternatives shown will have common leading letters with the misspelled word.

The word processor does not automatically create a backup file, and this essential task has to be done by the user. In a product aimed at novices, it really should

be automatic. Also it's a problem to add a character to the end of the last word on a line — First Choice adds a space between the word and the new character and puts the new character onto the next line. There are ways around this but it shouldn't be necessary.

Function Keys

Also at the top of the screen are labels for the function keys- F1 (Help), F2 (Save), F3 (Features), F4 (Print), F5 (Edit) and F6 (Style). By pressing F1 at any time, in any application, context sensitive help is available.

SAVE brings up a file menu, allowing saving of the document, and in other applications the database, report or spreadsheet. It also allows erasing a file, and in some applications saving of part of a file or merging of a file.

FEATURES allows various functions depending on the application — find and replace, spell checking, set tabs and indent, set margins and page length, recalculate a spreadsheet, and so forth.

PRINT allows all or part of a document, spreadsheet or database to be printed, and offers the option of printing form letters or labels.

EDIT allows text, or cells of a spreadsheet, to be selected, cut, copied to the clipboard and moved. It also allows whatever is in the clipboard, a temporary storage place, to be pasted back into the same application or another application.

STYLE, in the word processor and database, sets the printed appearance of the characters — bold, underline, italics, superscript, subscript, single space or double space.

Database

The database is a very simple flat file. A screen is easily 'painted' by the user with field names and room left for data entry. Specification of field lengths is not required as the program takes care of such details. Searching for data and displaying it on screen is good. Search criteria can be over multiple fields. No browse capability was apparent.

Reports are limited to one line of the report per record. User created report formats are used, with the user selecting which fields are to appear and in which sequence. The report format is automatically linked to the database .FOL file. Reports are printed in sequence sorted by the first and second fields of the report format. The report can also have calculated fields, and

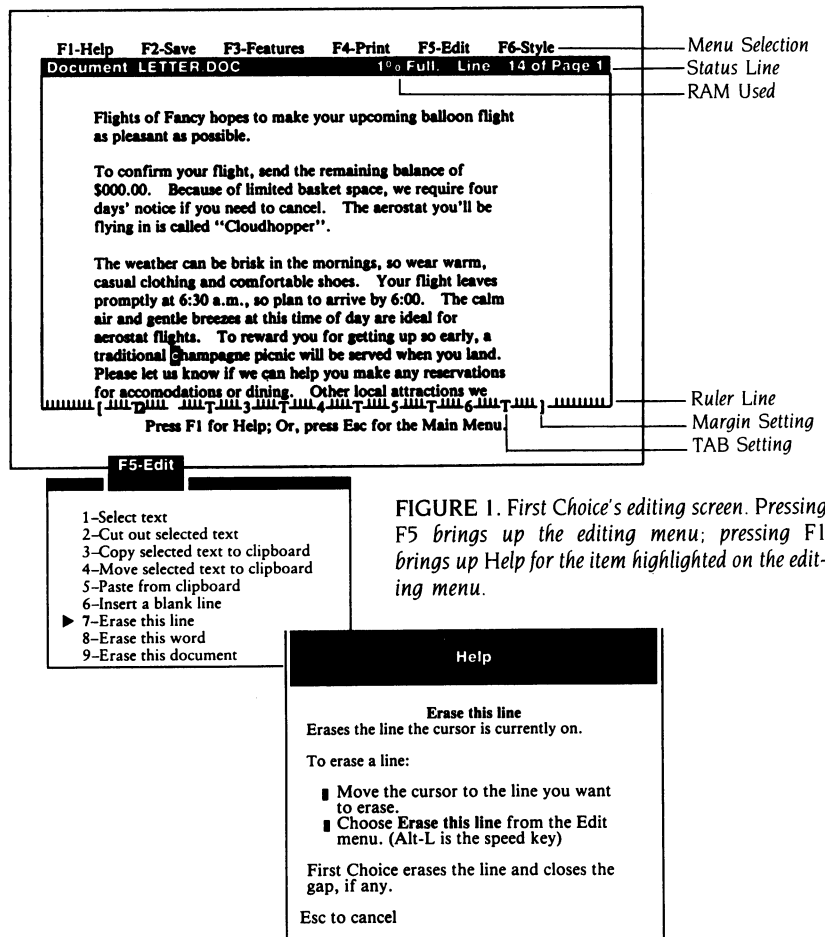


FIGURE 1. First Choice's editing screen. Pressing F5 brings up the editing menu; pressing F1 brings up Help for the item highlighted on the editing menu.

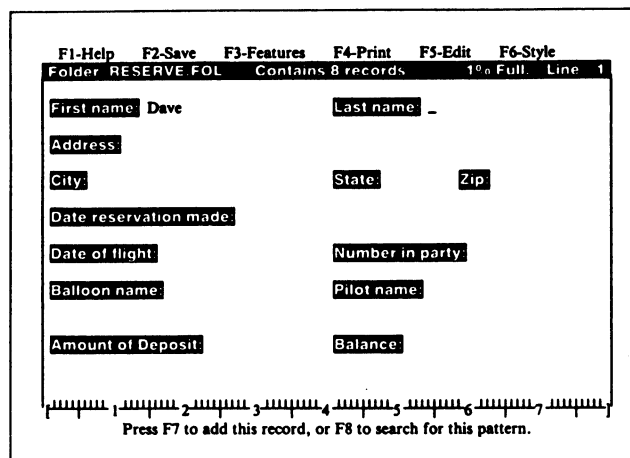


Figure 2. The database is a simple flat file that's extremely easy to set up — the user types in the field names where they're wanted and First Choice takes care of such details as field length.

Service Information

Service name: Dow Jones News
 Phone number:
 Create automatic sign-on (Y/N): N

Communication speed: 300
 Data bits (7 or 8): 8
 Stop bits (1 or 2): 1
 Parity (none, even, odd, mark, space): NONE
 Full or half duplex (F/H): F
 Use XON/XOFF (Y/N): Y

Esc to cancel ← to continue

Service Menu

- ▶ 1- CompuServe
- 2- Dialog Business Con.
- 3- Dow Jones News
- 4- MCI Mail
- 5- Official Airline Gd.
- 6- The Source
- 7- Other service
- 8- Other service
- 9- Answer incoming call

Use ↑ or ↓ to choose a selection, and then press ←; Or press F1 for Help.

Figure 4. Selecting 'Connect to another computer' from First Choice's Main Menu brings up the Service Menu. (The American services listed can all be customized by overtyping.) Pressing return after a selection is made, brings up Service Information which lists all of the information needed by the computer to make the connection.

If the potential user has an inquiring mind, one solution is Public Domain alternatives like PC-Write, PC-Calc, PC-File and PC-Talk. These are excellent value, and very powerful, but they don't have consistent user interfaces and transferring data from one to the other isn't easy.

never refused to work with Hercules-compatible software until First Choice came along. When I first plugged in First Choice, the A drive whirled, then all went dead and even Ctrl-Alt-Del did not work — back to the Big Red Reset. I removed all boards and equipment from the system that were not either genuine IBM or genuine Hercules. No improvement.

I put in a call to the excellent tech support hotline at Imagineering. They asked if I had an 8087, and indicated that I should reset the DIP switch so that it shows that no 8087 is installed. A quick check of the IBM Guide to Operations revealed that the switch was apparently set correctly. I don't always trust documentation, and reset the switch to the opposite position to that suggested by IBM's manual. First Choice then ran.

A later check of the IBM Technical Reference Manual suggested a different setting for the DIP switch to that in the

IBM Guide To Operations, which was the setting with which the machine was originally delivered.

Two demerits are hereby handed out. One to IBM for its conflicting documentation, the other to First Choice for being sensitive to a setting that has never affected any other software and, more significantly, of making no mention of it in its manual.

Another problem is that First Choice requires more files than will fit on one disk, and some overlay and dictionary files must be on the data disk in the B drive when it is run on an all floppy system. The procedure to create a data disk for use of the product with a twin floppy system is not adequately covered, and both the manual should be amended and a batch file provided to create the data disk to meet the needs of new users, especially those who haven't had a great deal of experience with computers.

Conclusion

I have some mixed feelings about First Choice. Its overall design is good, combining multiple functions under a consistent user interface and offering generally simple, menu driven operation. At this point it is ideal to the student or to the novice home user. It really does not have the power for significant business use, nor is it intended for this market. Transfer of data to other packages outside the PFS family is not particularly easy.

Value for money is very good, particularly when the 'street' price is considered. The whole package can be bought for less than the suggested registration fees for a similar range of user supported software.

Despite the few glitches I encountered, First Choice is hard to beat for the home or very small business user without the time or inclination to get deeply into computing. □

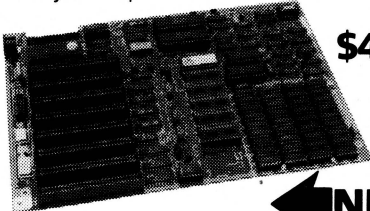
Product Details

Product:	PFS:First Choice
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Distributor:	Imagineering, 77 Dunning Ave, Rosebery 2018 NSW (02) 662 4499
Price:	\$448 taxed

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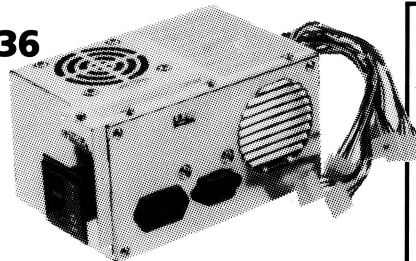
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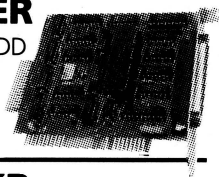
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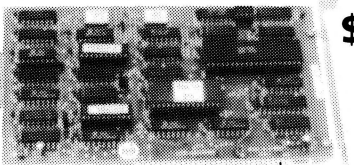
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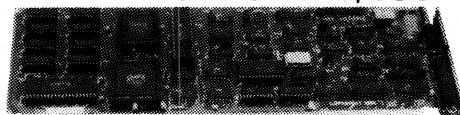
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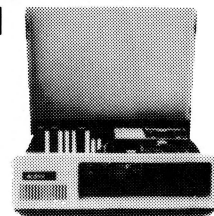
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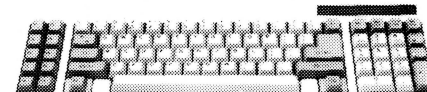
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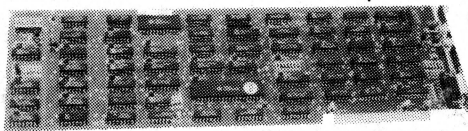


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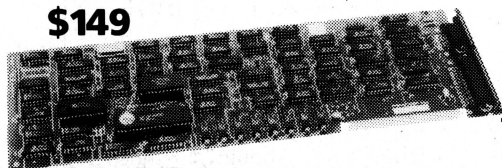
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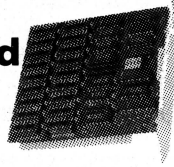
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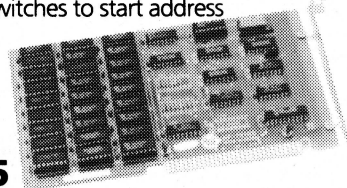
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- User selectable from 64K to 640K
- DIP switches to start address

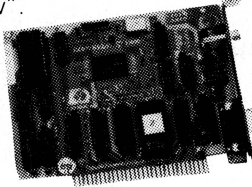


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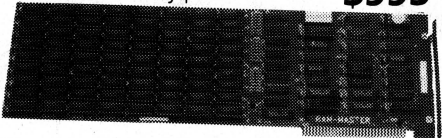
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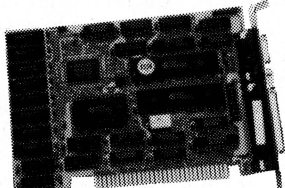
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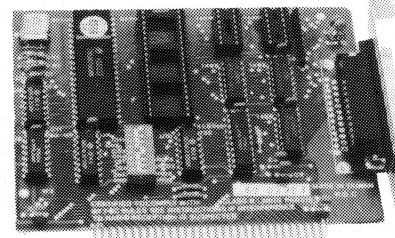
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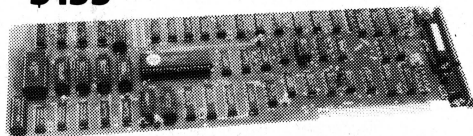
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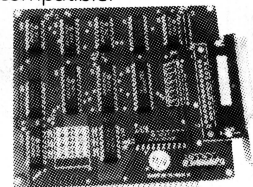


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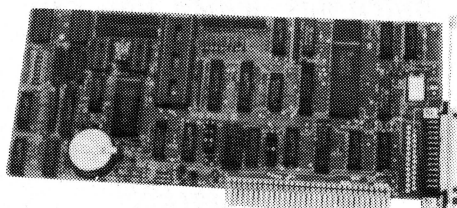
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Laptops

The Low Down On

Some tormented souls like the company of their portable — they kid themselves it is their docile pet. They travel with it, bring it home, they massage its keyboard late at night in humble homage to the mighty chip machine. Jan Roberts has taken a look at two machines, which you can homage too all you like, as examples of what is available at different ends of the market.

SOME PEOPLE DON'T mind having a big computer hulk sitting like a colossus (or status symbol!) on their desk, but many are glad to leave it there when they go home from work.

But some tormented souls like the company of their computer — they kid themselves it is their docile pet. They travel with it, bring it home, they massage its keyboard late at night in humble homage to the mighty chip machine.

Now there is an increasing number of good, *portable* machines that can satisfy their craving. I have picked out two of them as examples of what is available at widely differing prices. Both ran the IBM test software faultlessly — making it easy to the user to move between the office and portable machines.

The Bondwell 8 and Sotec PHC-16

They both had a full size display (24 lines by 80 characters wide) which makes editing on them relatively easy. But they both squash the display to varying degrees to fit it all in.

And they can be plugged into a normal office monitor — converting them effectively into desktop computers.

But the price range from \$1700 after tax for the Bondwell 8, which has been around for a while, to \$5000 before tax, for the Sotec PHC-16, a new machine on the Australian market. For variety, I also looked at the \$3000 version of the Sotec.

The Bondwell 8

The Bondwell 8 is a neat little machine about 11 inches deep, 3 high and 12 wide. (If you like new-fangled precision — 284 x 78 x 310 mm.) It weighs 5.5Kg (12 lbs). It is thus highly portable.

It contains rechargeable batteries. You can plug it in to the mains via a supplied 13.8V transformer. Twelve hours recharge will give it about eight hours of independent life. The power-on light blinks when the battery is running low. You can use it while it is recharging.

In its side there is a 720K, 3½ inch disk drive. You fold away its fixed carry handle underneath and lift up the lid over the keyboard to find the screen on the underside of the lid. The unit appears to be reasonably well made and it should wear well.

As soon as you turn it on, the Bondwell's main limitation becomes obvious. Its screen is a back-lit LCD and the words on it only become visible when you have adjusted the screen to the correct angle. I found that for most uses this is about 20 degrees from the horizontal — that means I bent the screen back till it was nearly flat on top of the machine.

The screen looks totally blank when it directly faces your eyes. But when you have adjusted it correctly, it is just sufficiently legible to be usable without eye strain. It is just as visible in artificial room lighting as it is in darkness.

There is a control on the side to alter the darkness of the letters, but I can't see anyone operating it without having this set at maximum darkness. Only then is it tolerable. Who would want them even fainter?

The print is also quite small — for it crams a full display of 24 lines into a screen that is 224 by 70 mm.

But — this is the price you pay for the machine and I should say that I found I could easily use the display. I wrote in WordStar, Word and in Framework II on it with ease (although not for a very long period).

I wouldn't want to use its portable LCD screen for hours and hours. However you can plug in an external monitor when you are at home or in the office. The LCD screen bends nearly flat back onto the top of the computer so it would never get in the way of the monitor.

Essentially, this is an IBM clone that is highly portable and which has the option of being used away from office monitors and mains electricity. For this you pay only a little more than the standard clone price.

The Keyboard

I found the keyboard keys not quite concave enough and thus a bit slippery. The keys feel a bit close together, but I found that I adjusted quickly.

The Function keys and Escape could be marked better. I couldn't understand why they are marked on the side and not on the top like the other keys. I found myself putting my face down low over the keyboard to read the numbers. If I bought the machine I would put stickers on top of these keys.

The numeric keypad is toggled on and off with a ALT RIGHT SHIFT combination (not the NUM key as I first guessed). When you redefine part of the keyboard as a numeric keypad, you can use the NUM key to toggle this keypad to cursor, Home, End, PgUp and PgDn keys.

There is also a directional key cluster on the upper right of the keyboard. When used with Shift this too becomes Home, End, PgUp and PgDn. This seems a strange duplication, but when I ran PC-Dial, I found only the HOME key accessed through the keypad worked; the other HOME key did nothing. A bad design feature is that there are no LED lights to indicate when the keypad or caps lock is on. Despite these quibbles — the keyboard has a reasonable feel and is quite usable even by a professional writer.

The machine has 512K RAM and it is not officially expandable. Pulsar Electronics said that it was quite difficult to expand, but at least one customer had opened it up and rigged on an expansion box for cards. However a machine so altered wouldn't be supported by Pulsar. It seems a shame. After all, this is basically a standard IBM clone and could have been made to be easily expanded.

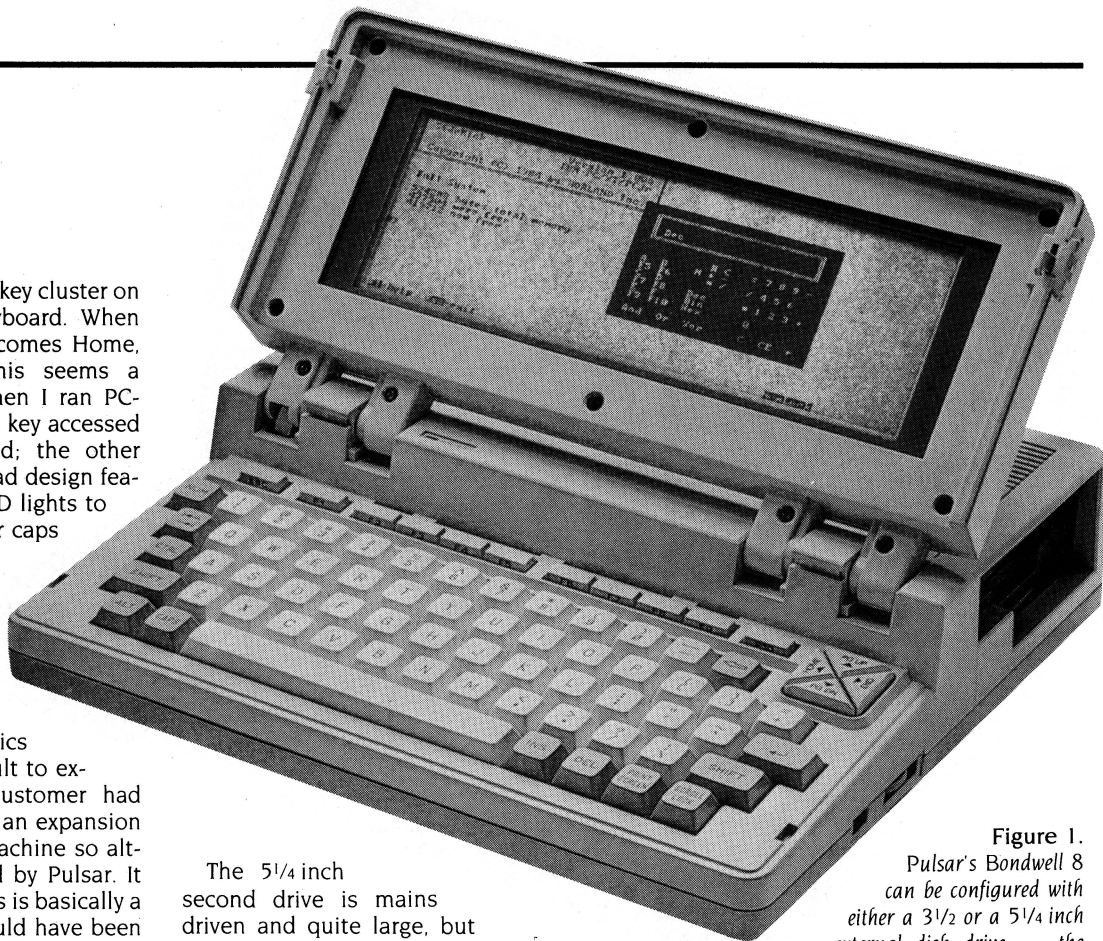
Pulsar were practically the sole Australian suppliers — but recently other Australian companies have obtained quite legitimate supplies from Bondwell. The competition has meant that the machine has dropped at least \$200 in price over the past few months.

In the US, it is supplied with an internal Bell standard modem. You just plug your phone line into a small port on the left and plug your phone into another port next to this. Unfortunately, this modem has been removed from the Australian machines and no Australian-compatible card is available to replace it.

The back of the machine has a port for a second disk drive, a serial port and a parallel printer port.

The second disk drive can be either a 3½ or 5¼ inch. I asked for the larger size — as do most of the Bondwell buyers.

The 3½ inch disks are far more robust for travelling than the 5¼ inch — but they cost more per byte stored, and many customers already have their software on the larger disk size. Apart from being more practical for a portable computer, the 3½ inch disks draw their power directly from the computer and thus don't require mains supply.



The 5¼ inch second drive is mainly driven and quite large, but with a 720K built-in drive, the second drive may not be needed when you are away from base.

The external drive on the demonstration machine was faulty — but the company quickly replaced it. Pulsar said they have a 12 hour turnaround policy for all repairs. The only catch is that the customer just has to get the machine back to them at Tullamarine, Victoria.

It works very neatly. When you switch it on, it checks to see if you have the second disk drive plugged in and switched on. It then asks if you want to run the LCD screen or an external screen. If you are using an external disk drive it asks you if you want it to be the A: or the B:. Finally, it asks if the external drive is 360K or 720K. You can simply press ESC to default to your previous selections.

If you haven't put a disk in, it reminds you and sits there calmly until you do.

Loading

It loaded Framework with ease even if slowly — but as it has no large Plus or Minus keys, you would have to write a Framework macro to redefine other keys for going in and out of Frames (Framework's writers did many people a disservice by presuming everyone had a standard IBM keyboard).

Bondwell have tried to make our lives a little better by providing utilities allowing the keyboard to be set by different European standards or by American.

Figure 1.
Pulsar's Bondwell 8 can be configured with either a 3½ or a 5¼ inch external disk drive — the smaller drive is driven from the computer's power supply, while the larger requires mains supply.

I loaded Smartkey, Smartclock and other RAM-resident programs — all without any difficulty. I ran both Word and WordStar — everything worked nearly perfectly. The only snag was that I could not distinguish the text I marked out as a block from surrounding text when editing in WordStar, which was only a minor hassle.

It is a delightfully quiet machine and keeps very cool without any need of a fan. Its processor is an 80C88 running at a standard 4.77 MHz. It has a real-time clock and comes with MS-DOS 2.11 and GW Basic. Its manual was well set out and easy to use. I wish other manuals were as thoughtful and good.

Despite a few small hassles, I found the Bondwell 8 a very practical portable with the major limitations being its screen and the lack of expansion possibilities.

The Sotec PHC-16

The superb Sotec PHC-16, comes in a number of configurations. You can get a machine with one internal single 5¼ inch drive for around \$3000 plus tax or a machine with two internal 3½ inch drives — and you can get a machine with a 20 Mbyte hard disk and an internal 3½ inch for around \$5000 plus tax.



Figure 2. Sotec's PHC-16 is available in a number of configurations — you can have a single internal 5¼ inch floppy drive or two internal 3½ inch drives, or a single 3½ inch internal drive and a builtin 20 Mbyte hard disk. External floppy drives are also available in either size.

Amazingly, the makers of the PHC-16 have designed it as if they EXPECT you to open it out, customise it, make it do just what you want it to. They have gone to great lengths to make this as easy as possible.

There is also a neat light second disk-drive at reasonable cost — and, for a high price, even a 5¼ inch drive that clips on the back of the internal 5¼ inch drive model.

It's not quite so portable a machine as the Bondwell 8. It looks more like a small modern portable sewing machine! However the models without a hard disk only weigh a little more than the others — about 3.6 Kilograms (12 lbs) or 4.2 Kgs (14 lbs) with the battery pack installed — and all the models fit under airline seats.

The non-hard disk models all work off internal batteries, car-batteries or the mains. The battery pack is an extra and can be recharged while you are using the computer. The machine comes with a AC power pack that slips into a port in the side. You can simply pull this out and replace it with the battery plug-pack — or with another plug-pack that works off a cigarette lighter socket.

The keyboard is latched onto the front of the machine. Detach it — and you start to see the unique combination of features that makes this machine outstanding.

The screen facing you is a highly readable 80 character by 24 line yellow plasma screen with amber writing. It's the best I've seen on a portable — very easy to read and the plasma screen isn't as red as some other machines. A plasma screen working on batteries is most unusual; I have not checked how long the batteries will last.

I tried it in WordStar — and the screen script is a delight to use. With a colour monitor plugged in, it has a standard colour display. You can adjust the angle of the screen for the best view although it is very readable at all angles. It supports standard IBM graphics.

You can plug in a standard colour monitor and it will run fine. However, you would have to park your machine sideways at the end of your desk (drives facing you) so it would not obstruct your monitor.

An Infra Red Keyboard!

Now, the keyboard is ultra slim, light, well made, comfortable to use and *cordless*, and it's connected by infra red signals to the computer.

I used it next to my infra-red controlled television — the controls on both machines worked perfectly without interference.

The computer is very well shielded. Even the doors to the various removable components are coated with metal foil. When I used it near my television, only Channel Two suffered — and then not with heavy interference.

I tried it out from various distances — and found it works within a two meter radius. It has to be on the same level as the receptor below the screen however.

A long cord (10 feet coiled) is available for situations where the infra-red connection is not practical. (Such as when you are using an external monitor and have parked your computer out of the way. However, for normal table or desktop use, it is wonderful to be able to move it around so freely. You can even hold the

keyboard sideways and strum the keys like a guitar!

A friend who suffers badly from RSI was most impressed. The light, slim keyboard was by far the easiest to use that he had found.

However, much to my dismay (because I don't realize it was happening), the keyboard can run out of battery power at the most inconvenient moment. No warning is given. The first sign of this was having to retype letters several times until the key-click told me that the machine had registered the letter. The next sign was having to move the keyboard closer in and to a more directly in-front position.

There is no caps lock indicator; I wish it had one. Disconcertingly, it locked upper case too easily. I found that whenever I used the Shift key the caps were locked. When the caps locked I found that I could not type the number keys so that when I typed 1, up came !. When I typed 3 the # sign came up. I am *not* used to the shift key shifting the numbers!

When you turn on the machine a display comes up allowing you to set the size of a RAM disk. You use the arrow keys to set anything aside up to 720K as your second drive.

This RAM disk is much better than that standard on IBM computers; it does *not* empty itself when you reset the machine with Ctrl-Alt-Del. This means you can load it with your favourite programs at the start of a day — and they will remain at your instant beck-and-call until you switch off. There is a Reset button next to the disk drives that really does wipe the RAM disk.

You can set the DIP switches inside the modem compartment to automatically load a 360K or a 720K RAM disk.

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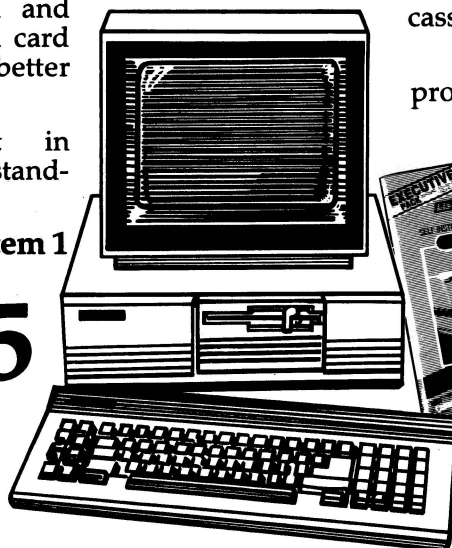
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I've let it out now. Yes, there is a door in the side, right under the memory card door, into which you can put an Australian compatible modem card. All I had to do was to plug it into my phone socket.

It comes with 2K of CMOS permanent memory to store its settings for a built-in world clock, for its modem, monitor and key click volume. You can add 8K to this — and permanently store say a phone list in your computer. Full and quite easy instructions are given for adding these chips.

Amazingly, the makers of this machine have designed it as if they expect you to open it out, customise it, make it do just what you want it to. They have gone to great lengths to make this as easy as possible.

The Add Ons

It has more than the usual array of ports: serial, parallel, second disk drive, RGB and Composite Video ports and external expansion port for an optional (quite expensive) three card expansion box. More than the socket for an optional 8087 maths co-processor.

Inside the modem door it has instructions on how to re-configure a great array of DIP switches.

A second screen of Instructions tells you about the various help screens that are available at any time. All of these are accessed with CTRL LEFT SHIFT combined with various other keys. Combined with 'S' (for Screen), you can toggle between various different LCD screen character intensity options.

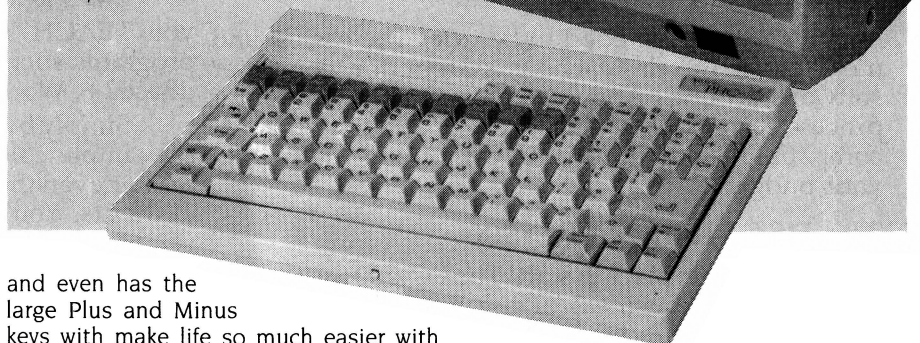
If you want the World Clock press 'W'. This gives you the current time (and date!) in 24 cities around the world. You can change this to put in your own selection of cities as long as you know the time difference between your choices and Greenwich Mean Time.

With 'R' for 'Remote Terminal' you get the modem. A screen of instructions allows you to set up your choice of parameters: baud rates from 110 to 9600 are supported.

The machine uses CMOS chips wherever possible to keep down power consumption. It thus does not need a fan and operates utterly quietly. (The Pulsar's hum was noticeable beside it.)

The keyboard has four AA batteries in it (supplied). It has all the usual IBM keys —

Figure 3. The Sotec PHC-16 comes with ports for serial and parallel connections, a second disk drive, a RGB monitor, and composite video and it includes a port for an optional external three card expansion box.



and even has the large Plus and Minus keys with make life so much easier with Framework II. There is however no cursor cluster — the numerical keypad is positioned to serve that need.

I also was lent a 20 Mbyte hard disk version of the machine. This does have a fan — and cannot operate on batteries. When power is switched off, the hard disk automatically parks itself to make it safer to transport it. There is no room however for a streaming tape unit to back up the hard disk.

It is quite noticeably heavier than its non-hard disk cousins.

I ran AutoCad, Framework, Gem, Word, WordStar which all worked perfectly. The screen copes well with graphics. It is a good versatile tool quite capable of handling the best of desktop publishing programs and doing major publishing tasks.

There is a Reset button near the disk drive. The use of this will wipe your RAM disk, but the normal Reset (Ctrl-Shift-Del) does *not* affect your RAM disk.

I hate my own IBM clone for its bad habits. If, for some reason, a program crashes and I have to reset the machine — I always have to re-load all the programs back into my RAM disk. This machine is lovely in the way it protects the RAM disk.

Speed

It runs WordStar a little slower than my 8-bit Microbee, but much faster than my standard IBM clone. The hard disk is not amazingly fast — but it means that you do not have to carry separate program disks with you when you travel.

The hard disk PHC model with its 3 1/2 internal disk plus the optional (pay more) 5 1/4 external disk, a 720K RAM disk and a 20 Mbyte hard disk, is most usable. You can load software that is on either of the two standard floppy sizes. Only MS-DOS 2.11 comes with the machine.

My final recommendation for all those computer slaves who cannot be allowed outside of their master's vision. Weigh up carefully what you can afford and what precisely you want the machine for. Don't get the hard disk if you can't lift weights, if you don't need to carry a great number of files and programs with you, and if you can't afford \$5000 or more.

If you only need a standard IBM portable clone and do not need to use it away from the office for hours at a time — then the Bondwell may well serve all your needs. It fits inside a brief case unlike the PHC and it runs IBM software easily.

If you do need to use a machine frequently, away from any desktop monitor (and if you value your eyes), then I highly recommend the cheaper floppy disk driven PHC, although it is nearly double the Bondwell's price. You do, however, get an excellent plasma screen and loads of RAM memory, and a machine that you can expand to meet your later needs. □

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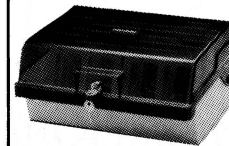
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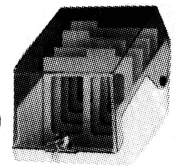
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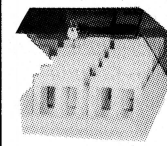
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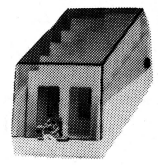
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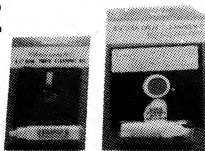


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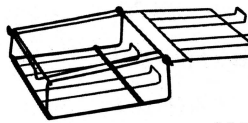
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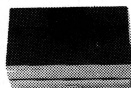
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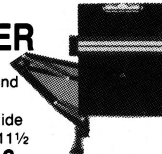
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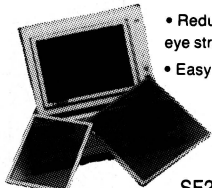
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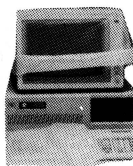


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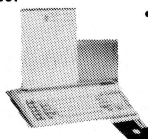
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Metro is the latest of the Terminate and Stay Resident offerings — Keith Mackay popped it up and found a powerful macro recorder plus a range of desktop accessories.

Lotus' answer to SuperKey and SideKick?

EVER SINCE SIDEKICK, pop-up programs have proliferated — we have seen Popup Deskset, Prokey, Keyworks, SuperKey, Maxam and very probably a good many others I haven't heard of. They are all Terminate and Stay Resident programs which are loaded into RAM before the main application and then sit there, usually in peace, waiting for an invoking keystroke, at which point they take over.

TSRs have been an excellent strategy for overcoming the single-tasking limitations of DOS; and I have even heard it suggested that all microcomputer software should Terminate and Stay Resident.

Essentially DOS does this, but a pop-up does much more — call up SideKick while you're running a word processor, find a phone number, extract a square root from the calculator, check an ASCII code, have a look at the calendar to see when your Aunt Betty's coming round for lunch and then go back to your Submission to the Board.

Metro is Lotus' TSR offering — it's a suite of desktop accessories and a macro recorder. It requires DOS 2 or higher and will run on as little as 80K, although it is quite prepared to use 512K if allowed to.

At a pinch, it can be used from a floppy, but a hard disk is necessary to take full advantage of the program. It's supplied on two floppy disks, the accessories themselves and the macro recorder. It's accompanied by a reasonably informative manual and is not copy protected.

In addition to the Macro Recorder, Metro's accessories consist of an Appointment Book, Phone Book, Filer (a disk-file management utility), Calculator, Notepad, Editor, List Manager, Watch (a timer), Clipboard, Special Characters (a table of ASCII codes), and Kaleidoscope, which allows the accessory colours to be changed.

Whatever the reason, renaming MAIN.DCT as BIG.DCT seemed to solve the problem, for Metro ran thereafter without creating any further havoc.

After some hours using Metro with WordStar 4 memory resident, I was a little upset to discover that the spelling overlay file, WSSPELL.OVR, had become cross-linked. A little later, my concern grew when the main dictionary file became corrupted; and by the time WordStar had become unusable and The Engine was entirely hung, I was a mite peeved. Fortunately, WordStar 4 has an autpatching facility which allows customised features to be reset when the program is reinstalled.

In part, the difficulty seems to hinge on names: WordStar's main dictionary is called MAIN.DCT, while the default names for all the Metro data files are also MAIN. The cross-linkage of the spelling overlay file, however, remains a mystery to me.

Whatever the reason, renaming MAIN.DCT as BIG.DCT seemed to solve the problem, for Metro ran thereafter without creating any further havoc. Any WordStar 4 users who acquire Metro should take similar steps, as well as ensure that your autpatch file is up to date. Black mark to Lotus for not noting this problem, whatever it is.

Installing Metro on a hard disk is a simple operation — batch files on each of the two distribution disks create directories to which the accessories and the macro recorder are copied.

Three of the Metro files are copied to the root directory, which is a little untidy — the only things which have any business on the root directory in my own view are COMMAND.COM, CONFIG.SYS and AUTOEXEC.BAT. The first time I ran Metro, I moved these files from the root directory to the Metro directory and made appropriate changes to the Path — this may conceivably have contributed to the mishaps.

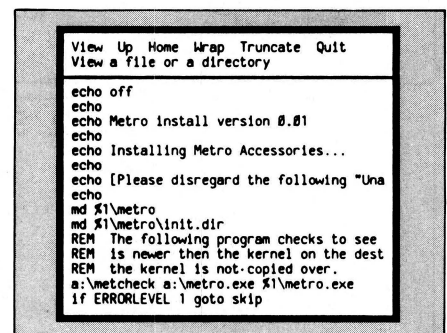


Figure 1. Metro's Filer is a disk file management utility — files can be viewed, copied, deleted and sorted, while directories can be created, copied and so on.

Ready For Action

Once Metro has been installed on disk, it is loaded by typing 'Metro' on the command line. After considerable disk activity and miscellaneous sign-ons, Metro is ready for action.

All the Metro accessories are invoked with an Alt-Shift combination. Pressing Alt-Shift-? allows fine tuning from a Configuration menu, including setting the

amount of RAM Metro is to be allowed to play with and selecting a colour or monochrome screen. The same menu also allows unwanted accessories to be suppressed and hot keys to be changed. Initially, there was a good deal of snow on screen, but the No Snow option cured this.

Colours can be set from Kaleidoscope, and by retrieving the colours of one utility and transferring them to another it is possible to set up all the accessories in matching tones.

The command structure for each utility is identical: F1 brings up a help screen and F10 brings up a menu, with the Return key going to various levels of submenu and Escape returning to the previous menu. With one exception — the Macro Text Window — the window sizes cannot be changed, although windows can be moved to any point on the screen. There is no Abort command — Quit saves any changes made, which is not always desirable. Any accessory may be temporarily cleared from the screen by holding down the two Shift keys.

Phone Book

Phone Book offers data either as a short list (the Index) showing simply names and telephone numbers, or in a more detailed listing for each entry (the Card).

Being used to the virtually immediate response of SideKick, I found Phone Book rather sluggish in loading. There is also a good deal of disk activity not only when Phone Book is invoked but also as its various options are used — these shortcomings are found in all the accessories.

Phone Book allows areas to be designated within each card for label, address and telephone number, which means, among other things, that a given entry can be printed without the telephone number — this feature has considerable potential for mail merging if used in association with the macro recorder. Phone Book is Hayes compatible, and can be made to dial numbers.

Filer is a disk file management utility along the lines of Norton Commander, allowing files to be copied, deleted, viewed and sorted, directories to be created and removed and so on. Again, there is considerable disk activity when Filer is invoked and its response is by no means fast.

Clipboard is designed for transferring text or numbers from one place to another — spreadsheet particulars to database, for example, or appointment lists from Metro's Appointment Book to a word processor — all the Metro accessory menus include the option of copying data to the Clipboard. Graphics is, however, not acceptable.

When data is copied to Clipboard for later inclusion in another application, it can be formatted as spreadsheet, normal or word processor.

Initially, there was a good deal of snow onscreen, but the No Snow option cured this.

Special Characters

Special Characters is a very small window showing the complete set of ASCII characters in Octal, Decimal, Hexadecimal, Graphic and Mnemonic form. Any ASCII character can be copied to the Clipboard, and the numeric equivalent of any ASCII character can be identified by typing in the character. It is also possible to do the reverse: to enter an ASCII code and discover which character it represents.

Appointment Book shows schedules by day, week or month. It also allows appointments to be checked for any particular day, past or future — I called up March 3rd, 1909, which happens to be a Wednesday, and discovered that I had the whole day free.

Alarming

Alarms can be built into appointments and set up to sound a given number of minutes beforehand. Unfortunately, the Alarm does not indicate why it is sounding — it would have seemed a better idea to flash a message onto the screen, as the Calendar in Word Perfect's Library utilities does, for example.

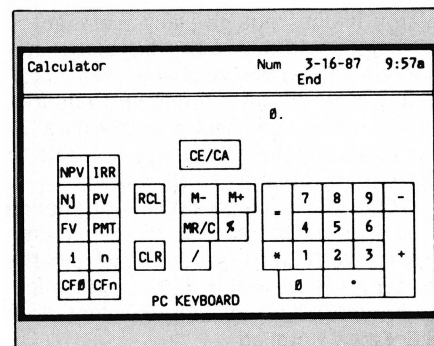


Figure 2. Calculator provides an impressive array of mathematical and financial functions in addition to straightforward arithmetic: Constants, Scientific Notation, Net Present Value, Internal Rate of Return, and so on.

Calculator requires the appropriate keyboard files to be active if the computer has the AT or Enhanced AT keyboard, otherwise the default PC/XT keyboard file will be used. Num Lock is automatically activated when Calculator is invoked and returned to its previous status when Calculator is 'put away', to use the manual's terminology.

As one would expect in a Lotus product, Calculator provides an impressive array of mathematical and financial functions in addition to straightforward arithmetic: Constants, Scientific Notation, Net Present Value, Internal Rate of Return, and so on. Results of calculations can be copied to the Clipboard but are not otherwise saved.

Watch, according to the manual, 'helps you keep track of how you spend your time'. More specifically, it offers a countdown alarm, a stopwatch and 100 adjustable timers.

The Stopwatch can be started and stopped either within Watch or outside it. The Countdown Alarm plays a little tune when a given period has elapsed, although, like the Appointments Book

Product Details

Product:
Manufacturer:
Review Copy From:

Metro
Lotus, USA
Imagineering
77 Dunning Ave.
Rosebery NSW 2018
(02) 697 8666
\$168

Price:

alarm, it does not give any message on screen to indicate why the alarm has sounded. The timers are used to time individual tasks in days, hours and minutes, up to a maximum period of 999 days, 23 hours and 59 minutes. I was not able to evaluate this feature to the full.

Notepad is a simple text editor offering space for eight 14 line by 40 column pages. Word wrap is automatic and the cursor is always visible, both of which features constitute an improvement over SideKick's NotePad.

Editor is a basic word processor which will read and create ASCII text files. Unfortunately — as far as I am concerned — Editor does not recognise WordStar commands, which are accepted by a number of programs and are perhaps a de facto standard. Editor offers all the basic word processing features: overwrite, insert, tabs, word-wrap, block manipulation, and search (forwards only).

List Manager is for the creation of to-do lists, allowing notes to be appended to individual items and lists to be sorted according to various criteria. As with the other accessories, anything can be copied from List Manager to Clipboard for use in another application.

Macros

It is the inclusion of the Macro Recorder which sets Metro apart from other TSR programs. Macros can range from simple text macros through text-command combinations to complex conditional processing. From 3K to 16K can be set aside for macros out of the total amount of RAM which Metro uses — the manual recommends an allotting 130K.

Creating a macro involves invoking the Macro Menu, designating the key to hold the macro, and entering a description. The Menu is then automatically cleared from the screen and all keystrokes become part of the macro until the Macro Menu is called back.

Macros can be edited, re-assigned to other keys, deleted and, naturally, saved to disk. They can also be temporarily suspended if the key they use is essential to a given application.

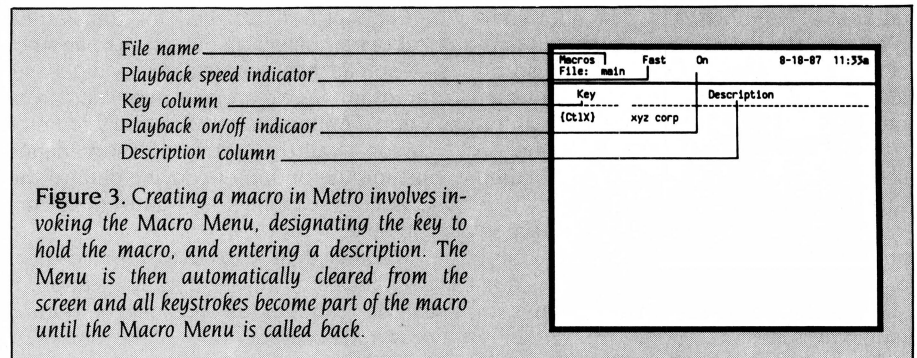


Figure 3. Creating a macro in Metro involves invoking the Macro Menu, designating the key to hold the macro, and entering a description. The Menu is then automatically cleared from the screen and all keystrokes become part of the macro until the Macro Menu is called back.

It is the inclusion of the Macro Recorder which sets Metro apart from other TSR programs. Macros can range from simple text macros through text-command combinations to complex conditional processing.

At a more sophisticated level, delays can be built into macros to give the computer time to respond, or simply to give the user time to read a screen display, while they can also be made to be interactive, pausing for input from the keyboard.

The macro menus can also have an option which brings up a list of defined macros at the top left of the screen. This allows any macro to be played back by selecting it from the menu.

A Text Window can also be built showing, for example, arcane Symphony commands or displaying a train timetable. Text for a Text Window can be taken from another program by means of the Clipboard. At a higher level still, the Advanced Commands make Macro almost a programming language, with nested macros, go-to branching and looping, conditional processing and parameter passing within subroutines — the possibilities here are virtually unlimited.

There is no doubt that all the accessories with Metro represent a considerable improvement over their SideKick counterparts, although SideKick's speed is missing.

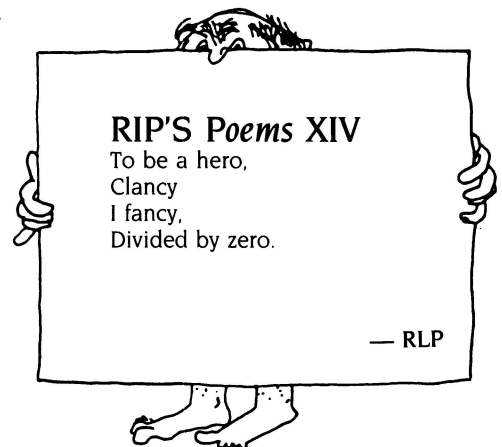
SuperKey

Metro must inevitably be compared with SuperKey, the only other serious macro recorder currently available. SuperKey is a program I use daily, and I find it indispensable not only for its macros, which are its main function, but also for its Command Stack.

This Command Stack records DOS commands as they are entered and allows them to be modified or used again with only a couple of keystrokes — this is a feature which Metro could well do with.

The procedure for macro definition in Metro is rather more cumbersome than SuperKey's simple Alt=, but there can be no doubt that Metro offers considerably wider scope for the creation of elaborate macros.

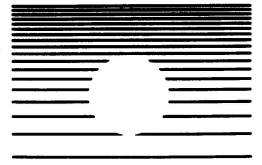
Despite Metro's initial inexplicable hostility to WordStar 4, it is undoubtedly an excellent product. An integrated set of pop-up utilities and macro recorder is something for which there is a clear need; and although like most integrated software, Metro falls down in one or two areas and skimps on others. Its advantages as a unified package probably outweigh its blemishes. □



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ADD SOME ZING, some zest some PEP to your printer set-up. The PEP product range comes from Banksia Information Technology, a company set up in Hong Kong by Australian Ex-patriate David Hartley who left David Hartley Computers, then a division of the Paxus Group, to set up on his own in 1985.

Banksia Information Technology manufacture a wide range of products including Le Clone, an AT workalike I have not seen in Australia. The products which I have for review are all printer enhancements designed to extend the scope of your printer.

The package arrived, from wherever such packages come from, and I thought I had received a consignment of shoes. The units all share the same external package, a striking black box about the size of a shoe box, with only the name of the product overlayed by the Company Logo. The moulded foam packing is also shared by the range and it was just like Christmas, opening all these little boxes.

The first box, opened at random, was the PEPbuffer. The small black box, smaller than a 5¼ inch disk and about three quarters of an inch thick, shares the striking matt black finish of the external package, with the Company Logo in red and white.

The only external features are two LEDs, one marked Printer Ready, and the other, Buffer Ready plus a reset button. There is a female DB25 connector on one end and a standard Centronics plug on the other.

Described as a 'smart' buffer and having 256 Kbytes of RAM, the PEPbuffer can stand alone as a normal print buffer or become part of a wider application. Each product is supplied with its own 9V DC plug pack.

The PEPbuffer, along with the rest of the range, can be controlled with a unique Command Protocol Structure. These commands use displayable characters which may be embedded in any wordprocessing file.

The tilde (~) followed by a two or three character command is used to input the commands — for instance: ~BPI would pause the output of data from the buffer to the printer. A full series of commands may be incorporated in any file or program and the choice of the ~ character makes sense unless you use that character regularly for something else. (I guess it would limit the market in Spanish speaking countries.)

The commands may be inserted into a software package's printer set-up strings or entered directly from the keyboard at the DOS prompt and using PrtSc to send them directly to the printer. Smartkey or

similar programs could configure your keyboard for single key entry of regularly used commands.

The buffer is smart enough to handle graphics and multiple copies of text files. The Command Structure command for multiple copies (say 4) would simply read: ~BS at the start of the file and ~BE04 at the end. Most word processors allow multiple copies but re-load the text for each copy. PEPbuffer saves this loading time by recalling the text from its own RAM. No cables are supplied with the buffer, your normal printer cable will run to the buffer and an additional cable is required between the buffer and the printer.

PEPswitch

PEPswitch allows you to have two different printers plugged into the same computer. These may be totally different styles of printers, one could be a plotter or dot matrix and the other a daisy wheel or high speed band printer.

Such switches are normally hardware only and when they are both within reach this is acceptable. When they are at opposite sides of the room, PEPswitch's Command Structure allows you to change printers with a software command — very nice indeed.

PEPswitch honors all your printer's error reports and will not feed data to a

Product Details

Product:	PEP range of printer enhancements
Manufacturer:	Banksia Information Technology, Hong Kong
Distributor:	Mike Boorne Electronics, 3/16A Hill St, Roseville NSW 2069. (02) 46 3015
Prices:	PEPbuffer 256K \$244 PEPswitch \$204 PEPsharer \$310 PEPchex \$375 PEPnet/Master \$200 PEPnet/Slave \$200 (All prices untaxed)



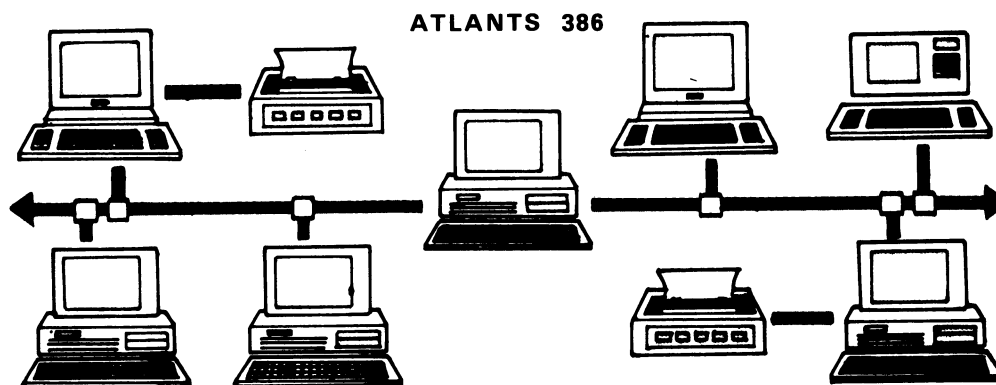
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printer which is switched off or reports an error such as paper out.

The unit has two modes, Command Mode and On Line Mode. In the latter, all data, including the Command Structures are passed to the selected printer without any response to the commands.

Next Box Please

This time it's the PEPsharer. With the advent of high quality, fast laser printers, it makes great sense to share one expensive printer with a number of computers. PEPsharer takes care of all the messy house-keeping this exercise requires.

The unit has a normal output socket on the side and four input sockets on the top. Simply plug up to four PCs into the top and one printer into the output, and you're in business. PEPsharer looks at each input socket and prints from the first it finds active. When data stops, it waits long enough to be certain it is not just a pause in printing and looks along the other inputs to see if anyone else needs its service.

Hardware adjustment of the Poll Period is described in the manual and can be set from 1 to 120 seconds.

PEPchex

When I want my PEP checked, I'll call Dr Kloosman, but when I want to run a printer up to 300 meters from my computer, I'll call PEPchex.

Normal Centronics cables are limited in length to about 3 meters. After that, nasty little bugs get in and eat up data. PEPchex allows a tenfold increase in this distance with automatic error detection and correction. It will work even in a 'dirty' or electronically noisy environment and is essential if you decide to share a printer some distance from a series of hosts.

PEPchex is supplied as a pair of units, one for each end of the cable and is a lower cost solution where only one unit needs to be extended.

Printer Sharing Network

PEPnet is a simple, inexpensive printer sharing network which allows up to 30 computers to share a printer. It would have to be a very high speed printer, or very low demand operation to carry 30 inputs, but used in conjunction with the other products in the range, the power of the system starts to become apparent.

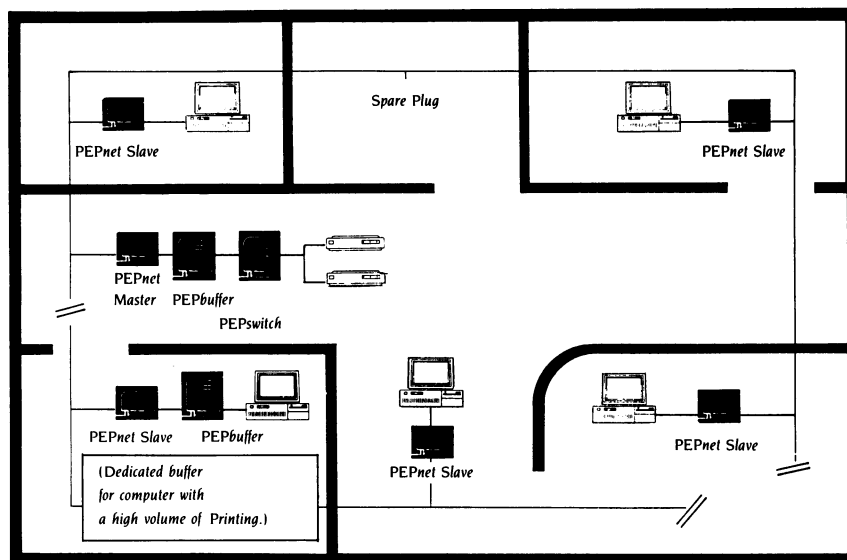


Figure 1. This example configuration using the PEP range of printer enhancements has five computers sharing two printers.

A PEPmaster unit is located near the printer, and each computer requires its own PEPslave. PEPnet carries out error detection with the 'Fletcher 16 bit, 1's complement checksum' method — Don't rush for the encyclopedia, rest assured that it works and the data transmitted will be the same as that received.

The documentation doesn't to get too technical but it does describe in detail how to make your own cables for every application.

The data transmission rate of the PEPnet system is substantially faster than the output of your computer so even when faced with numerous errors to check, the operation will be invisible to the user.

The PEPmaster box should be located as close as practical to the printer station and can be wall mounted. Cables between the master and the slaves are simple shielded 'twisted pairs' and could be routed along existing phone line locations or totally hidden for permanent applications.

The PEPmaster needs to know which slave is sending data so each slave is allocated a number by means of DIP switches.

Documentation

The documentation is simple and well done. Each component comes with a spiral bound instruction book which describes (in simple language), the whole of the PEP range. Full instructions on the syntax and usage of the Command Protocol Structure are easy to understand and a series of common examples are given.

The documentation doesn't get too technical but it does describe in detail how to make your own cables for every application. A complete chapter on troubleshooting seems to cover any likely error message from either the PEP equipment or your computer. At the back of each manual there is a section for your record of installation and slave designations.

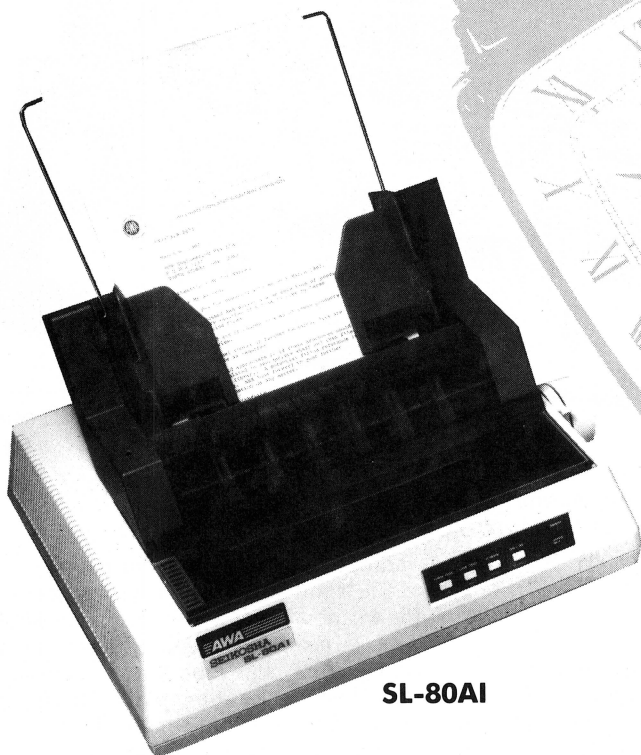
To sum up, this is a very well designed and produced group of products. Well presented, well packaged and well documented. There is no doubt that substantial savings could be made with all or part of the range in almost any application that uses multiple PCs.

The quality of construction is excellent — the all-metal cases have a nice substantial feel about them. My only very minor criticism would be of the use of plug packs. More and more offices seem to have the power points very close to floor level, and plug packs extend too far below the level of the prongs to fit.

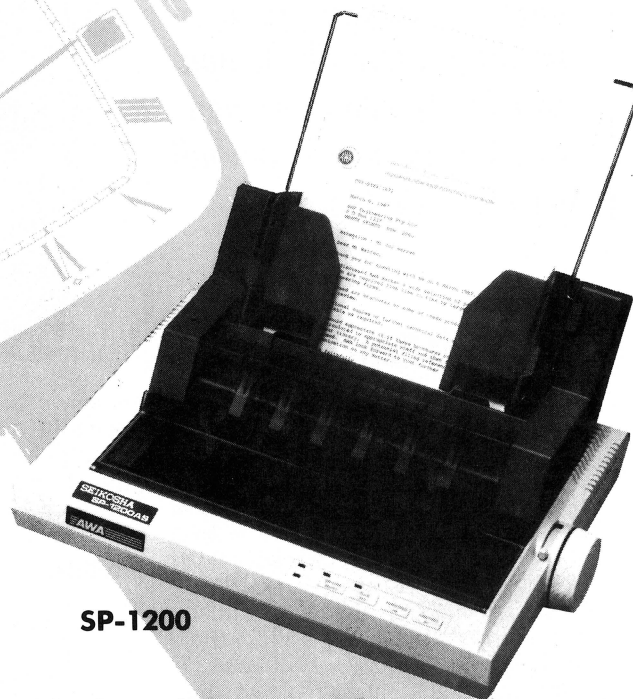
This is more a criticism of the plug pack than the PEP units as the alternative would be a much more expensive power supply in each unit. □

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SEIKOSHA



SL-80AI



SP-1200

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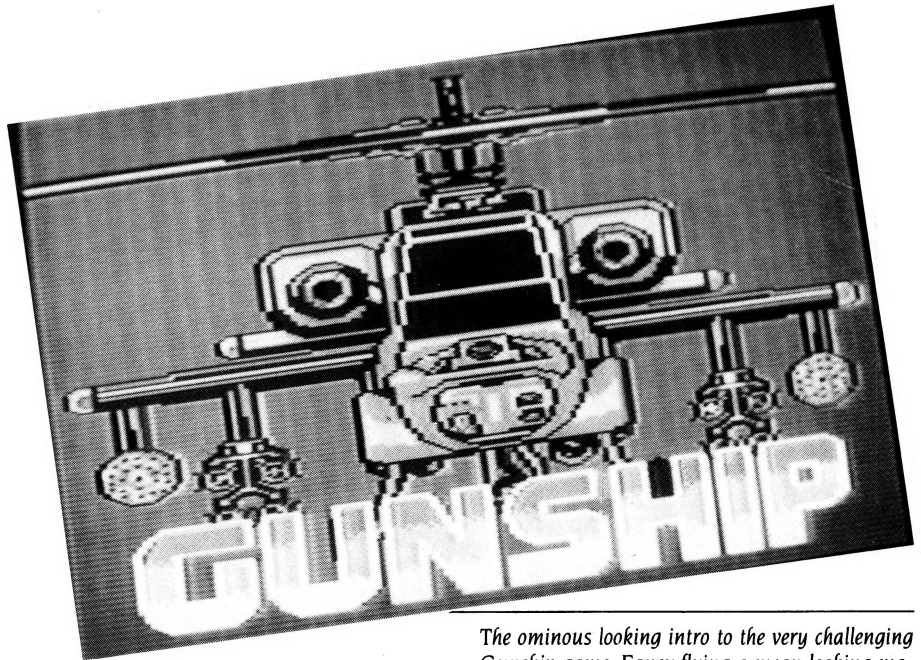


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The ominous looking intro to the very challenging Gunship game. Fancy flying a mean looking machine like this?

Gunship

THE STEADY BEAT of rotorthrob fills the air, as an AH-64A Apache appears over the brow of the hill. Even as the squad of guerrillas turn and bring their weapons to bear, a hail of 30 mm rounds descend upon them. The pilot turns his head to bring TADS' (Target Acquisition & Designation Sight) on line with a Shilka self propelled AA gun. TADS laser guides a hellfire missile to it's target. The Apache descends to under 100 feet, and heads toward the next hill, flying low to avoid radar.

Without a doubt, this is the best simulator of any kind that I have met yet. And from what I know about helicopters, it is accurate, too. I haven't been game to try fighting the Russian forces in Europe yet, but I have had some very entertaining battles in Southeast Asia and Central America.

Helicopters seem to have always been more fun to fly than planes, and the Apache certainly is fun. There are heaps of options to keep everyone busy, from training in the US, where you get to fight all sorts of everything, without the likelihood of getting shot down, as the 'enemies' are firing blanks, to first line Russian troops in Western Europe, with all the advanced weapons they can throw at you.

The Apache can carry quite a hefty load of armament, starting with 1200 rounds for your 30 mm chain gun, the heaviest weapon carried by any helicopter. The chain gun fires 625 rounds per minute and

is aimed by TADS, so you don't have to point the Apache at the target, which is a good thing considering that the recoil of the chain gun forces you upward. It can easily shoot to the sides of the helicopter, at a small loss of accuracy.

Hellfire

You also have laser guided 'Hellfire' anti-tank missiles, with a range of up to 6 kilometres (normal missiles have a range of 3 km). You can carry Folding Fin Aerial Rockets, they're unguided but can destroy the targets that Hellfires are useless against. Interestingly, you get your first introduction to two 'Sidewinder' missiles, range 18 kms for use against enemy helicopters.

While the AH-64 is bristling with offensive weapons, it also has its share of defensive equipment, including jammers

and decoys for infra-red and radar.

The simulator (obviously) includes all the weaponry, and it also includes a whole heap of gear for the enemy. Each has its own picture, and most are recognisable from their picture after a while. This is very useful in working out what to hit first.

Flying the Apache is a challenge, but as you get better you can do a lot with it. As you progress you can make the games reality levels higher to compensate — at the moment I have Gunship set so all landings are perfect. You can have it so that instead of getting 'You landed hard', you get 'you crash landed'. You can also alter helicopter flight (easy/realistic) and how the weather affects you. ▶

Product Details

Product:	Gunship
From:	Microprose America
Distributed by:	Ozisoft, Suite 33, 8-24 Kippax St., Surry Hills, NSW, 2010. (02) 211 1266
Operates on:	IBM and compatibles, Apple II family, Atari 800XL/XE, Commodore 64/128, Atari 520 ST or 1040 ST, and Commodore Amiga.
Price:	Disk \$48.95, Tape \$48.95

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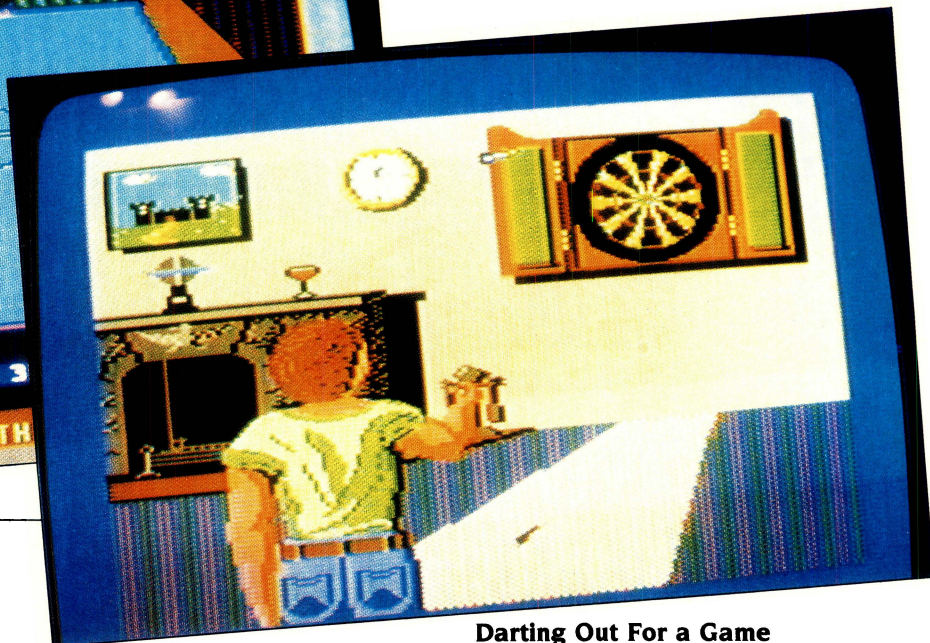
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Playing Around



The view of the air hockey table, as you would see it in the arcades, and just as realistic to play.



You can relax with a social game of darts in what looks like a very cosy room. A lot of detail has been included in the game which relies a lot on skill to win.

Indoor Games

INDOOR GAMES' is a change from the old standard combinations like Summer, Winter, World Games and so on. Three games on the disk are: Darts, Ten Pin Bowling, and Air Hockey.

I play a mean game of air hockey, passable darts, and I've watched a lot of bowling, so I had a fair idea of what the games were going to be like.

Indoor Games will keep track of one to four players, while they play the three games. High scores can be saved (and loaded) from disk. Each game is loaded in separately from disk, as the majority of sports games do, so it could be a bit less enjoyable to play from tape, due to the (relatively) long loading times.

Ten Pin Bowling

The first of the three games is Ten Pin Bowling. It's not my favourite of the three, as I'm no good at it, but that doesn't alter the fact that it's very good. The bowler is well animated when he bowls, and after he releases the ball down the alley you see the expression on his face as the ball travels then misses/hits the pins.

You can alter ball weight, alley slickness before you play, and in the game you control where the bowler stands, where he 'places' the ball, when he releases it, and how much spin is put on it. Luckily all this is controlled by the joystick, and quite straightforward. Most people can play it quite well.

My bowler spent rather a lot of time following the ball down the alley though.

Darting Out For a Game

After a game of bowls you can relax with a nice skillful game of darts. Darts is my second favourite game of the three and it's also quite hard to master.

You choose the aim of the dart, the trajectory and the strength of the throw, and then the view goes to a shot of the player throwing the dart, and then a close up of where it has hit (if it didn't bounce off of the wires).

The graphics in this are beautiful, too, and the dart makes a realistic thud as it hits the board. Quite a lot of skill is needed to play the game well, but it's a very easy game to get into.

Air Hockey

And now onto my favourite game, Air Hockey which is a faithful simulation of the actual game found in the arcades, and plays at the same speed. Even the angles are faithful to the full size game.

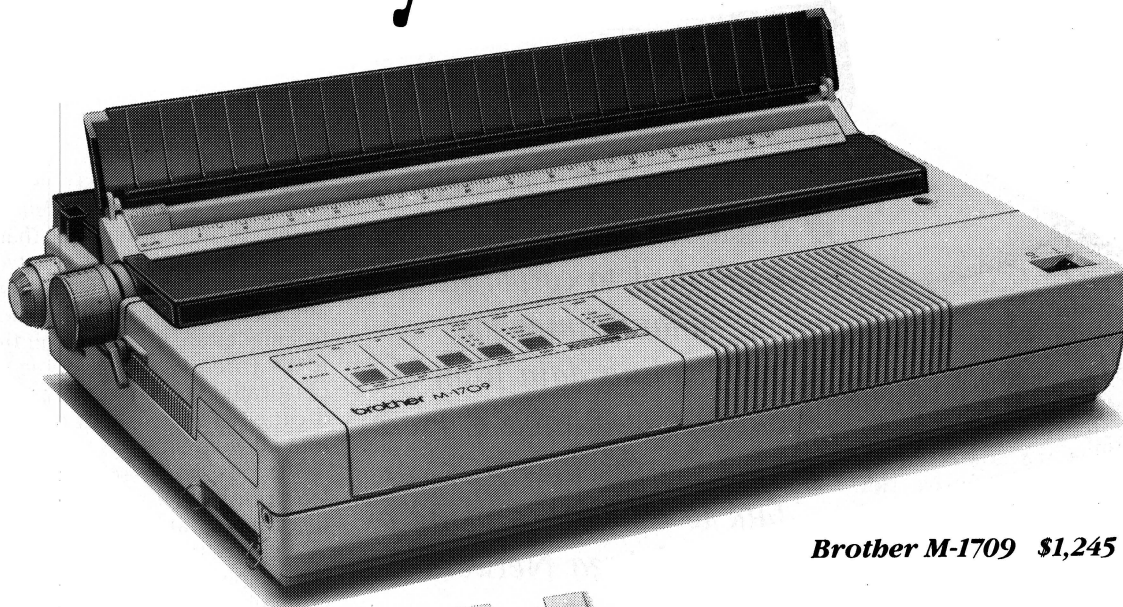
I'm experienced at the game, but this is driving me mad as the computer is just so good on it's higher levels. There are months of challenges in Air Hockey alone.

I'd pay the price for the Air Hockey on its own, but when you realise the package has three great games on it . . . This is really good value for money. With a little practice you can be darts champion, bowling champ or air hockey king of the neighbourhood. □

Product Details

Product:	Indoor Games
From:	Designstar
Distributed by:	Ozisoft, Suite 33, 8-24 Kippax St, Surry Hills, NSW, 2010. (02) 211 1266
Operates on:	Commodore 64/128
Price:	Disk \$38.95, Tape \$34.95

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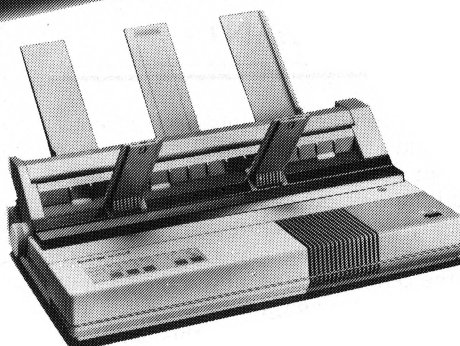
But that's only part of the speed story.

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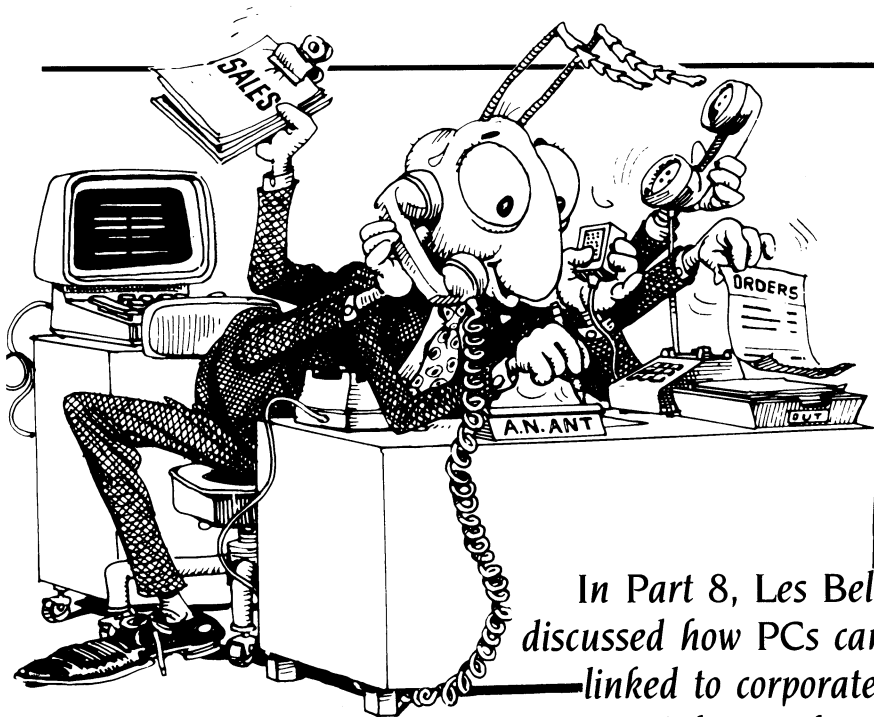
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PCs in

In Part 8, Les Bell discussed how PCs can be linked to corporate mainframes for downloading data from the mainframe database. Here he discusses how PCs can talk to other PCs using a Local Area Network (LAN).

IN PART 8 (YC, Apr. '87), I discussed how personal computers can be linked to corporate mainframe computers to allow the downloading of data from the mainframe database. However, this doesn't solve the problem of allowing PCs to communicate amongst themselves at high speed, and in particular, of allowing users to share data or programs on a central machine.

The answer to this problem is the Local Area Network (LAN). A LAN connects together a number of personal computers, providing high speed data transfer between them (relatively speaking that is; it's still not instantaneous and many first-time users are singularly unimpressed). With suitable software, it allows users to share central storage for files, in some cases share the files themselves (by allowing multiple users simultaneous access to the same file) and also share expensive printers such as laser printers.

Networks work in a variety of ways. First, there is the wiring scheme used. Some work in the same way as traditional mainframe or minicomputer terminal networks: that is, all the PC workstations are wired independently to the central computer. On large networks, this leads to a huge bundle of cables coming down through the ceiling of the central computer room, which is exactly the kind of problem LANs are supposed to fix! Nonetheless, this does provide high performance with comparatively simple software; often the central computer is simply a minicomputer running a standard operating system like UNIX or DEC's VMS.

More complex systems have a central computer with cables radiating away from it, but each cable can have multiple PC workstations attached along its length. This is called a multi-drop cable system. Alternatively, there may be no computer at the centre; instead, any of the computers attached along the cables can act as the file server, and in fact, this is the way IBM's new Baseband Network system works.

However, the most powerful network systems are generally wired in one of two ways: as a ring or as a bus. A ring network has a cable formed into a loop, with PCs inserted into the loop around its periphery. In other words, each PC has an input connector, which joins to the preceding PC in the loop, and an output connector, which goes to the next.

In this kind of network, each PC must be powered up and working in order to relay messages which appear on its input, and are not addressed to that PC, onto its output. And PCs can't simply issue a message whenever they feel like it; instead, a special empty message, called the token, circulates continuously around the ring. The PC sends a message by waiting until it receives the token, then replacing it with the

message. When the acknowledgement is received, it replaces the token on the ring.

This technique ensures that every PC gets a fair share of the capacity of the network, but it is prone to disruption when any PC goes 'off the air' unless special techniques are used to repair the network. IBM's Token Ring Network is a more sophisticated version of this technique, and it currently appears that this is the major IBM network product.

The bus wiring scheme uses a single long wire, which snakes around an office or a building, and all PCs tap into this wire as it passes them by. Once again, PCs cannot simply transmit at will; instead they generally use a technique called Carrier Sense Multiple Access with Collision Detection (CSMA/CD) to control who can use the cable at any time. This sounds complex, but basically it's not (we'll skip the details, which are!).

Essentially, a workstation which wants to transmit a message listens until it hears no other signals. This is the carrier sense part of the process. It then starts sending its message, but as it does so, it simultaneously listens to the signal on the cable. If all it hears is its own signal, all is well, but if it hears garbage, then there is corruption because another station is simultaneously transmitting. This is a collision.

When a collision occurs, both stations stop and wait for a random period before retrying. Because they wait for a random period, this time, one will start before the other, which will have to wait. However, if a second collision occurs, both stations now wait for up to twice as long as last time, and so the network slows down until the messages get through reliably.

This process is often compared with the way people communicate at a cocktail party: if two people talk at once (collision) then they both pause, and then the less polite of the two gets in first! And of course, you don't interrupt other people (carrier sense).

Marketing—Part 9

—or Marketing for Birdwatchers —The Last Part

The most popular version of this kind of system is Ethernet, which was jointly developed by DEC, Xerox and Intel. It is now marketed by a range of suppliers including Ungermann-Bass, IBM, and 3COM.

But enough theory; what should you look for in selecting a network, and what benefits will it bring?

Points to Watch

First, before worrying about anything else, consider security. Stand-alone PCs do not constitute much of a security risk. If someone is sitting at your PC, browsing through your sales figures, you can see them and know you've got a problem. But once your PC is on a network, someone can be sitting at their own PC, apparently concerned with their own work, but actually looking at your files.

PCs can't simply issue a message whenever they feel like it; instead, a special empty message, called the token, circulates continuously around the ring.

Most security violations in companies are just casual browsing by non-technical users; the 'hacker' who will expend vast amounts of time and effort cracking into your system is pretty much an urban myth. Some do exist, though, and while most PC networks do not have dial-in access, if a technical person in your company wants to get access to your files, there's not a great deal you can do to stop them.

Therefore, it is worth selecting a network which has adequate security facilities, such as the ability to password-protect files, subdirectories, disk drives and even the entire network. Another useful feature is the ability to log users' com-

mands — that way, if someone is trying something, you'll be able to see who it is and what they are trying to do.

Most low-cost networks do not have adequate security, and so valuable files should not be left in shared volumes of hard disks on file servers, but should be kept on workstations which cannot be accessed from elsewhere. In any case, most of the really low-cost networks do not have adequate performance for heavy-duty file-sharing applications, and are best suited for simple electronic mail and printer-sharing applications.

Next, beware of confusing network bandwidth with file transfer speed. Network manufacturers are prone (like all of us) to putting the best interpretation on our products' performance, and so they like to quote Big Numbers. The Big Numbers for networks are the bandwidth figures —

IBM Broadband Network:	2 Mbits/sec
ARCNet:	2.5 Mbits/sec
IBM Token Ring Network:	4 Mbits/sec
Ethernet:	10 Mbits/sec

These are the rates at which data can be squirted down the cables; they are *not* the rates at which files can be transferred between PCs. Do not assume, for example, that using by Ethernet you'll be able to transfer a Megabyte of data between two PCs in less than a second. Other users have to share the bandwidth, for a start.

But more importantly, humble PCs simply cannot throw data onto the cable that fast and they certainly cannot catch it again at that rate. For a start, the transfer rate of data off the hard disk is perhaps a hundred kilobits per second, if you're lucky. Add to that the operating system's overhead in moving the data around in memory, plus the overhead of assembling packets of data with error detection and correction check bytes added on, plus the addresses of the recipient and sender, and then the overhead of the access protocol,

such as CSMA/CD, and it's surprising that the whole thing ever works at all!

For example, I benchmarked one network based on ARCNet, which has a bandwidth of 2.5 Megabits/second, and found that the actual data transfer rate was 24 kilobits/sec, or roughly one per cent of the bandwidth. There's nothing wrong with ARCNet; in fact, it's one of the best networks, and we use it ourselves.

But my point is two-fold: firstly, do not expect data transfer to be instantaneous. It will be, for very small files, electronic mail messages and the like. But the idea of putting large programs, like Lotus 1-2-3, on a central file server and downloading them whenever required doesn't work; they don't load as fast as from a local hard disk, and in fact, on the network described above, Lotus 1-2-3 would need between 40 seconds and a minute to load (depending on the version!).

Secondly: because the bottleneck is in the hardware of the PC, and not in the network itself, upgrading PC performance also upgrades network performance. In fact, some networks use special file server machines which are specifically designed for the purpose and do not suffer the limitations of PCs, and these networks generally provide higher performance than those which use purely PCs. If selecting a PC-based network, make sure that the file server is at least a high performance AT-style machine or a Compaq 386 or similar, and ideally, the workstations should be AT's also.

The next major point to bear in mind is the availability of software for your chosen network. Networks require special versions of software to cope with the demands of file sharing, for example, and

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while single-user versions may work well, there is always the chance of coming to grief when two users try to access the same file, for example.

Naturally, IBM has set the standards here; their networks support a low-level block of code called the NETBIOS which many applications use. Therefore, if your chosen network provides an IBM-compatible NETBIOS, you should find that network software will work fine.

Many manufacturers of network hardware do not write their own software, but instead provide either Novell NetWare or Microsoft's MS-Net. If the software you want is available in a version for NetWare, the answer is obvious; if it supports MS-Net, check out whether your network has a compatible NETBIOS.

Think about reliability; networks which depend upon a special dedicated file server stop completely when the server fails. However, if the server is an AT-type machine, you may be able to quickly substitute another machine, restore all the files from the latest server backup and get on the air again. Repairs to custom servers can be slow and expensive.

Magazine reviews are a good guide to network reliability; in general you should give greater weight to critical reviews with negative comments than reviews along the lines of 'We bought this, and gee whiz it's great!' — usually it's great because we bought it, and we're never going to admit to buying the wrong network!

Finally, give some consideration to the availability of software which provides what we term value-added services. For example, your proposed application for a network might be to allow multiple users access to a shared price list database; but it makes sense to provide other services like electronic mail, diary/calendar management and perhaps print spooling. Electronic mail in particular is 'one of those things that once you've got it, you wonder how you ever lived without it'. I'm currently working on a new version of our operating system that no longer supports electronic mail, and I'm suffering withdrawal symptoms and writer's cramp.

Once you have electronic mail, there are no more little sheets of paper bearing telephone messages to get lost on your desk, you don't have to keep retrying people's telephone numbers because they're engaged and they don't drone on about the weather and how's the wife and kids when you do get through, and memos

tend to get shorter and to the point. Furthermore, once you have a network you'll want to periodically notify all users about new software, spreadsheet templates and shared databases which are available and electronic mail is the ideal way to do it. In fact, electronic mail is the answer to many of the problems associated with supporting any medium-to-large network.

You might choose not to run IBM's own software on the token ring, however; its security is pretty abysmal and the performance is not too sparkling, so check out Novell NetWare, which is a networking operating system which replaces DOS.

Real Networks

Having pondered these and other weighty questions, you might be ready to look at some real networks. I hesitate to offer advice, especially in print, because the market changes so fast, but here are a few starting points:

IBM Token Ring Network. This is IBM's major offering (at least for the time being). It's worthy of consideration because it allows the construction of fairly large networks (up to 270 or so PCs per ring, although only 72 are supported under the IBM PC Network program) and doesn't degrade severely under increased network loads — it just gradually slows down, where others fall apart in a screaming heap.

In addition, IBM has gotten serious about this network. They currently support four different types of cable (plus optical fibre), two different adapter cards for the PC/AT (and another on the way for Personal System/2) plus others for the PC/RT and various minis and terminal controllers as well as the 3275 mainframe communications controller. Multiple rings can be gatewayed, and the older broadband network can also be linked through dedicated PCs. Optional software allows users

on the network to perform 3270 terminal emulation through 3274 or 3278 emulation cards somewhere on the network, and also dial out or in through modems attached to PCs on the network. It's also possible to write intelligent front end software which communicates with mainframe applications using a technique called SNA LU 6.2 and a product APPC (Advanced Program-Program Communication). All of this runs under PC DOS 3.2 and 3.3.

NetView/PC. This is another IBM operating system for the PC (there's a mainframe version as well, but it seems that most mainframe installations prefer an Australian product called NetMaster). NetView is multi-tasking and can run PC DOS as a sub-task. It also runs other software, such as the Network Manager program, which constantly performs diagnostic checking of the network and will log any errors or failures it finds and even notify a remote mainframe.

There's lot more, including newer high-performance versions of the network, support on new machines and even more software. It appears that IBM is very serious indeed about Token Ring, and that (plus the fact that over 300 hardware manufacturers have purchased the adapter development kits and presumably plan to release Token Ring versions of their products) makes it very worthy of consideration.

Novell NetWare. You might choose not to run IBM's own software on the token ring, however; its security is pretty abysmal and the performance is not too sparkling, so check out Novell NetWare, which is a networking operating system that replaces DOS. NetWare has evolved into a sophisticated, high-performance product over the years, and it solves problems that other network manufacturers haven't even realised exist yet. Security is good, there's provision for site licensing of software (which pleases the software developers). The print spooling capability and performance is good.

Torus Icon. Alternatively, if you want electronic mail and other 'electronic office' facilities, you might like to consider Torus Icon, which is extremely easy to use yet offers powerful electronic mail, filing and communications functions. Once again, this runs on top of the IBM Token Ring network. ▶

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ARCNet. This was originally developed by Datapoint and is now licensed to other manufacturers — it's another strong contender. It is similar to a token passing ring network, but its cable doesn't actually have to be in a ring — in fact, the rule is that there cannot be any loops in the cables. Running at 2.5 Megabits under Novell NetWare, it turns in a very respectable performance. (We actually run it under Digital Research's Concurrent DOS V5.0 with DR/Net on the Compupro multi-user machine, and that works well also.)

Amongst networks that use specialised dedicated file servers, two stand out: 3COM 3+, which runs either Ethernet or Token Ring, and **Novell S-Net**. On balance, with 3COM I'd prefer to go with the Token Ring version, as I have heard some alarming tales about Ethernets degrading exponentially as nodes are added, and I have not yet had an opportunity of performing some realistic benchmark tests.

The Novell S-Net is based upon the combination of ARCNet and their own 68000-based file server which is quite unlike a PC (absolutely no chance of running PC software on it, for example) while the 3COM box is based on an 80186. The S-Net system runs NetWare/68, whereas the versions which run on an AT as file server run NetWare/286.

Of course, there are many other networks on the market; the ones above are just the ones which immediately come to mind whenever someone says to me 'just a quick question, Les — we were thinking of buying a network...'

Applications

Once you have a network, what can you do with it? The major range of applications are those involving shared databases, such as on-line catalogues and price lists, inventory systems, and order entry systems. These can be implemented using a variety of products, with the addition of some programming skill.

While it is generally true to say that end users of PCs can pick up the necessary skills required to write their own stand-alone applications using packages like dBASE III Plus, it is also true that the additional complexity of multi-user systems, plus the increased reliability required of such systems, makes them impractical for end users to write. A skilled programmer could, however, take a single-user prototype created by a user and turn it into a multi-user system.

Many database products support networked multi-user operation. One of the oldest, more mature and most reliable is DataFlex, a compiled system (therefore less suitable for end users) which has supported multi-user operation for many years, under early 8-bit networks, and more recently under MS-DOS networks as well as Unix and VAX/VMS.

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what can you do with it?
The major range of
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involving shared databases,
such as on-line catalogues
and price lists, inventory
systems and order entry
systems.*

While Ashton-Tate's dBASE family has long dominated the single-user market, they have added networking capabilities to dBASE III Plus in an attempt to oust DataFlex from its dominant position. dBASE III Plus is an almost ideal tool for users to try out their ideas and construct a prototype which can be turned over to a professional program or PC Support person for completion.

However, beware! Multi-user operation under dBASE III Plus (especially V1.0) is made difficult by the presence of many 'features' (read bugs); for example, the RLOCK() (record lock) function does not work reliably. V1.1 is much improved, but probably the best course is to develop a prototype under dBASE and complete it to the multi-user stage under the Clipper compiler, which is much more reliable on networks (as well as cheaper!).

Other database products also support networks: Microsoft's R:Base System V, for example has been designed from the ground up with network operation in mind and offers a much more aggressive pricing policy than the Ashton-Tate product, as well as offering some slick code generators which do much of the work of writing application prototypes for end users. And Ansa Corp's Paradox is shortly to be released in a networking version which

has been undergoing beta testing for some time (almost a year).

Spreadsheet programs generally do not require file locking, because they typically are not used to build large applications with shared data. However, every corporate finance person dreams of the day when he or she will be able to consolidate financial models across the network, which will require such features.

Already some integrated software packages, such as Open Access II and Smart, offer these facilities. Both these packages also offer network database features and word processing.

Word processors do not require much in the way of special modifications to run on networks. They will need to know how to tell if a file is being edited by another user, and how to detach a printer, to make it available to another user, once finished printing. Special networking versions of some products, such as Microsoft Word and WordPerfect, are available; others, such as WordStar 4.0 have network support as standard. Watch out for some traps: for example, a user of Samna 3.0 told me that, although using the package on a single PC which happened to be attached to a network, and only using a single printer on the network, Samna was unwilling to print, and on contacting Samna to find the bug was told abruptly to buy the network version.

Networks can considerably enhance the sharing of information between co-operative users on multiple PCs. However, do not expect this to start magically happening; it requires much effort, thought and encouragement before people start making their expensively-crafted spreadsheet templates and databases available to other users. Make sure that all users on the networks know what software is available to them, and that they make the fruits of their labours available to others.

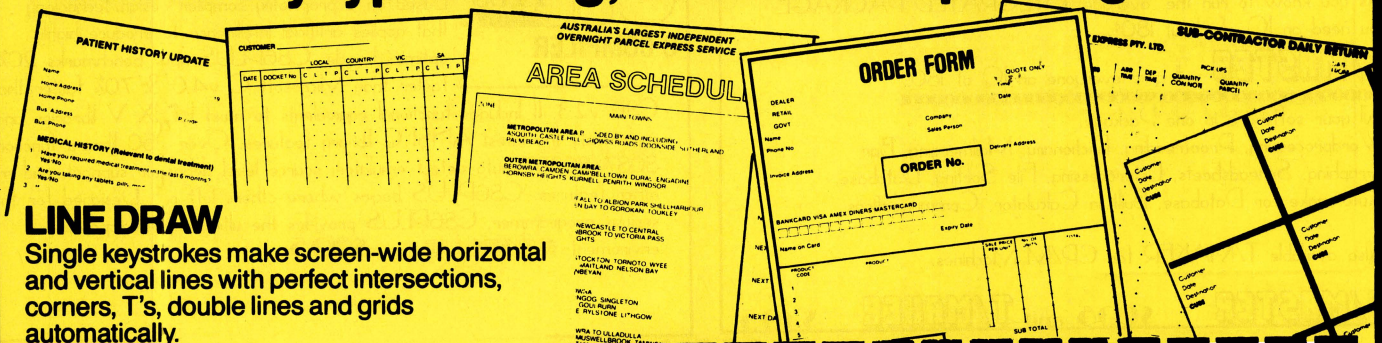
If you have followed this series, by now you should have an understanding of all the tools which are inexpensively available on personal computers and which will enable small organisations and marketing departments to construct extremely sophisticated marketing information systems, equal to or better than those used by the largest marketing companies.

If you are successfully applying these ideas in your company, I'd be interested to hear from you, care of *Your Computer*. □

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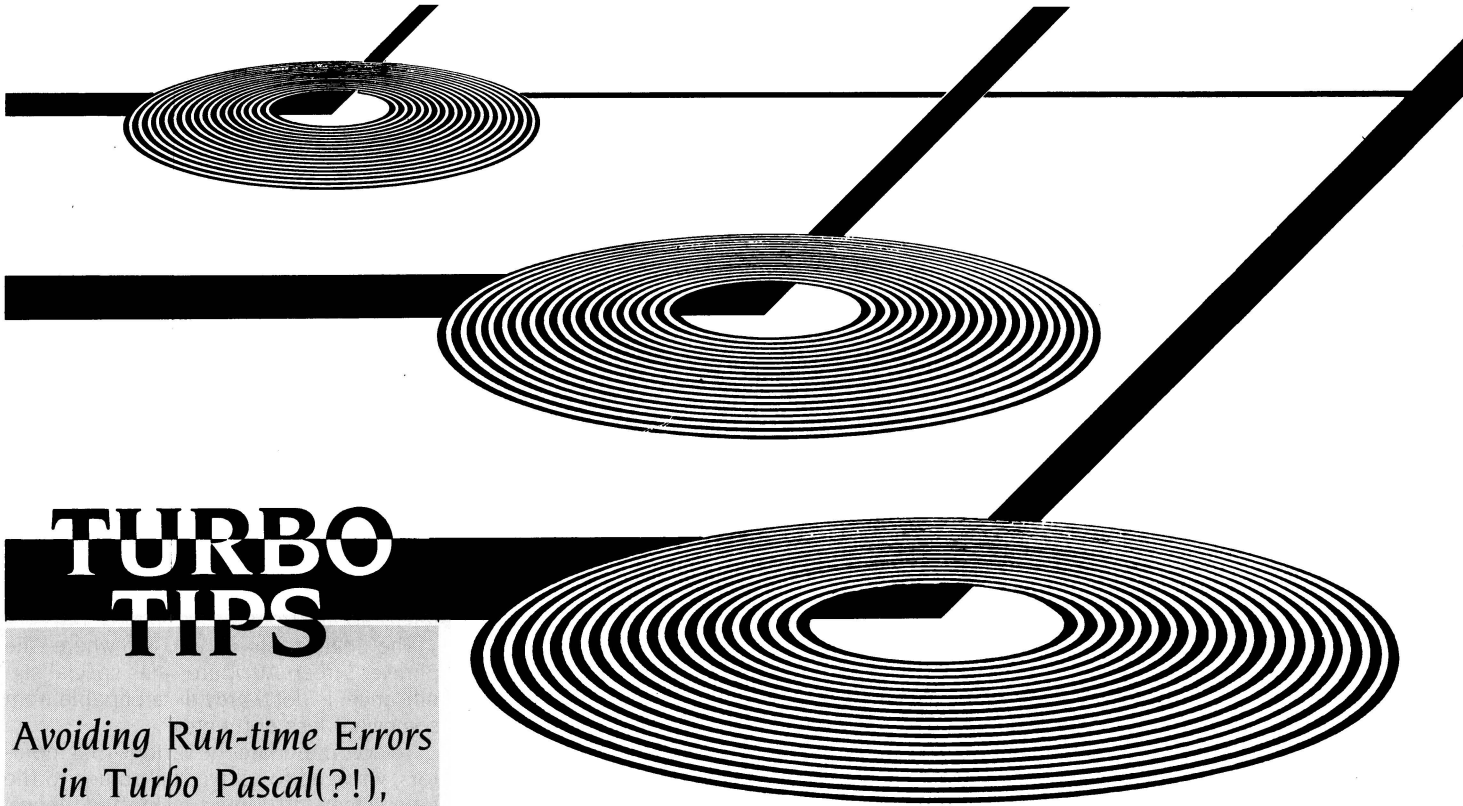
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TURBO TIPS

*Avoiding Run-time Errors
in Turbo Pascal(?!),
Missing Windows and
True Colours are this
month's Tips from
Peter Hill.*

TURBO PASCAL PROVIDES a number of special functions and compiler options for use on the IBM PC (or near offer). The Function Window() defines an area on the screen as the active work area, and that area behaves as if it were the whole screen. For example, if you WriteLn() more lines than can be accommodated in the window, the text scrolls within the screen.

Input/Output (I/O) re-direction is another useful PC extension. There are two compiler switches available for the IBM PC (\$G and \$P) which allow the user to Get and Put I/O respectively from other than the usual sources. If these are set, a DOS command such as MYPROG <IN> LPT1: will Get its input from the file IN and Put its output to the first parallel port. MS-DOS and PC-DOS achieve this by re-defining the default allocation of I/O devices (CON: and TRM:).

A simple program I was working on recently started to act in a most peculiar manner: it used the Window() function to define half the screen as a work area. De-

spite this, when I scrolled in the window the text over-ran the window bounds and generally behaved as if no Window() statement had been executed.

Bells started ringing when I also noticed that my attempts to set TextColor() and TextBackGround() were ignored; I thought I was writing to the screen whereas Turbo Pascal and MS-DOS had other ideas. Both the Get and Put compiler switches were active to allow I/O re-direction, and since the program was now reading and writing to/from a DOS file (which *might* be the screen/keyboard), commands which are specific to particular devices were not implemented, even when those devices were assigned.

If you want I/O re-direction on the PC, \$G and \$P are the way to achieve it, but you must then surrender the ability to perform functions which are specific to particular devices.

Run-Time Errors

It's not often that run-time errors occur in Pascal. The discipline of the syntax check-

ing during compilation ensures that it is relatively rare to have a program crash (as distinct from a program doing something other than what you had in mind) unless it is a mathematical model.

I've been doing some mathematical modelling of late and found that I couldn't guarantee that the user would not attempt to pass 0 or a negative number to the Standard Function Ln(), causing a fatal error. It's best to handle this before it happens with a function such as that shown in Listing 1.

It was a relief to take a break from all the error handling associated with floating point calculations and move on to a program to tackle anagrams, which uses the Random() Standard Function to re-organise words or phrases.

I was therefore surprised, in the wee small hours, to get run-time error 04, suggesting that I had passed 0 to Ln()! This small, text-based program obviously had no use for Ln() and I was even more surprised when Turbo Pascal couldn't find the error location.

```
FUNCTION Lne(Argument :REAL):REAL;
BEGIN
  IF Argument>0 THEN Lne:=Ln(Argument) ELSE
  BEGIN
    Lne:=0;
    Err; {Err; is a procedure which puts an error message
          on screen to warn the user}
  END;
END;
```

Listing 1. If you can't guarantee that the user will not pass 0 or a negative number to the Standard Function Ln(), it's best to take care of it with a function like this one.

I wonder which other Standard Functions make calls which need error checking?

The key to this puzzle chest is that the Standard Function Random(Nr) performs its randomisation (in part) by calling the Standard Function Ln(Nr). Nominally, Random without an argument returns a random real number between 0 and 1, and Random(Nr) returns a random integer between 0 and Nr. If you call Random(Nr) when Nr has the value 0, Ln(0) is called, run-time error 04 is generated, the program falls over in an untidy heap and, because the call to Ln() can't be found, neither can the error position. I wonder which other Standard Functions make calls which need error checking?

So calls to Random(Nr) need pre-checking to ensure that Nr is ≥ 0 , since Random(Nr) will place a call to Ln(Nr).

Missing Windows

A relatively simple portion of Turbo Pascal code (on an IBM PC clone) started to misbehave on me recently. The procedure was straightforward, using the Turbo IBM PC Procedure Window() to define an area of the screen as the whole screen and to write within it using WriteLn.

From previous experience I knew to establish my position within the window prior to using WriteLn. If you don't either ClrScr or GotoXY(), there is the possibility that your first writing will still be outside the defined window; I know that, so I had catered for it. Despite this, when I scrolled in the screen the text overran the window bounds and generally behaved as if no Window() statement had been executed.

Bells started ringing (no my computer doesn't come with bells, really!), when I also noticed that my attempts to set TextColor() and TextBackground() were ignored; again I thought I was writing to the screen whereas Turbo Pascal and MS-DOS were really in command. There are two compiler switches available for the IBM PC (SG and SP) which allow the user to Get and Put I/O respectively from other than the usual sources.

True Colours

I find typing —

TextColor(White);TextBackGround(Black); quite tiresome; this is really an area where the MicroSoft Basic statement — COLOR[foreground],[background],[border] is eminently more sensible. This, together with my penchant for preserving the tattered remnants of the English language, leads to this routine —

PROCEDURE Colour(x,y, :INTEGER);

BEGIN

TextColor(x);

TextBackGround(y);

END;

It can be simply called as Colour(White,Black), where White and Black have been previously defined, usually as constants.

Of course, the results of such a call are only partly predictable. On the IBM PC, for example, the call Colour(1,0) can have a variety of results depending on the screen and text display interface in use. Some examples are shown in Table 1.

DISPLAY ADAPTER	SCREEN	RESULT
Colour Graphics	Amber	Invisible.
Colour Graphics	Green	Light Green.
Enhanced Graphics Adapter	EGA colour	Barely legible blue.
Hercules	Green/Amber	Underlined.
Monochrome	Green/Amber	Underlined.

Table 1. The call Colour(1,0) can have a variety of results depending on the screen and text display interface used.

What a muddle! To further confuse matters, the Compaq implements the screen attributes differently, emulating both the monochrome display adapter and the colour graphics adapter simultaneously.

This is all irrelevant unless you write software which might be expected to run on a variety of machines. In practice, I find I only really need about four colours for an

application. These are — Normal, High-Light, Inverse and Flashing.

There are, of course, applications which need to make use of each and every colour available under your particular operating system, but they are relatively rare. Indeed, the need to make use of multiple colours (or, more formally, screen attributes) has only recently been felt by main-frame software developers, largely in response to the extensive use of colour in micro applications.

The Macintosh is a case where the phrase 'Screen Attributes' has special significance; is dotty grey differentiable from somewhat less dotty grey?

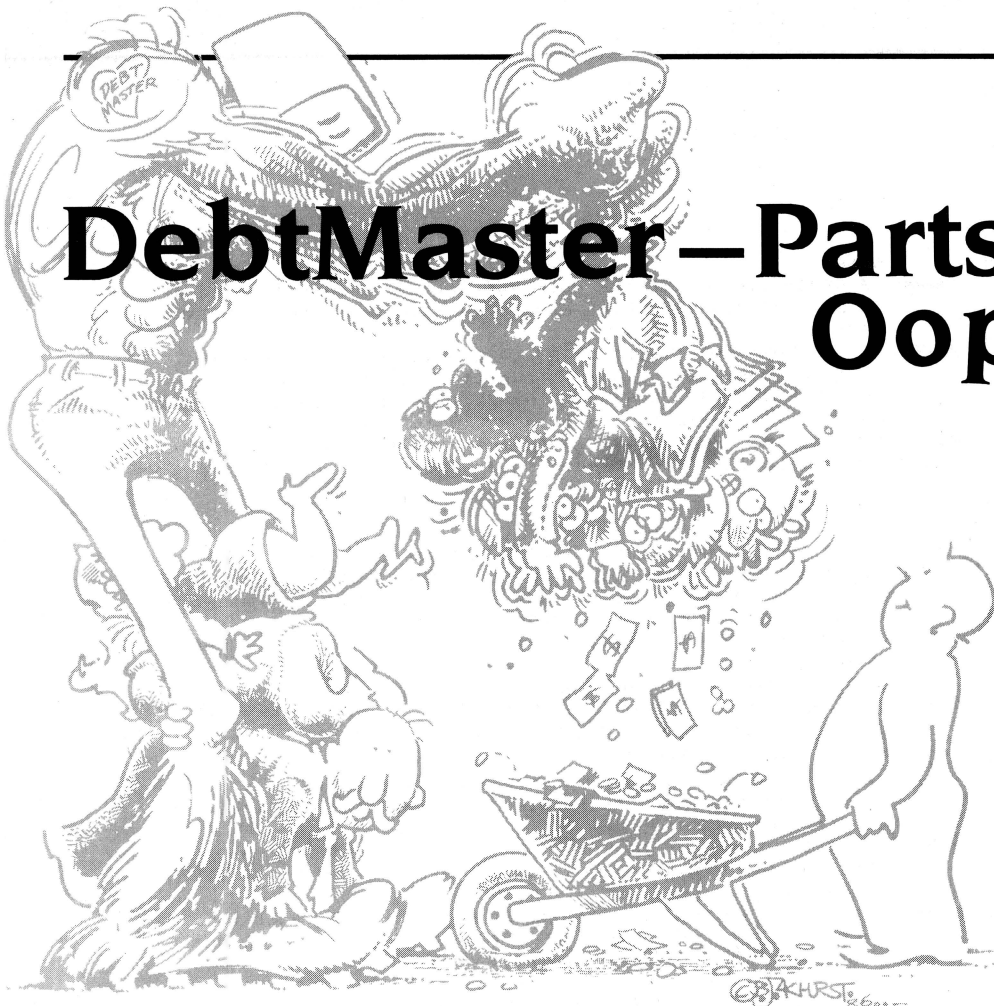
To accommodate the various IBM monitors, we need to assign real values to the four screen attributes suggested above. The appropriate values which work (for instance, give a sensible on-screen address on each of the monitor/graphic card combinations) are shown in Table 2.

Of course, this selection is two parts personal taste and one part clarity, but it is not a trivial task to come up with a consistent set of attributes which perform the above functions across the range of monitors and graphics cards available.

ATTRIBUTE	COLOUR PAIR	COLOUR (EGA)	COLOUR (Mono)
Normal : 7	7,0	grey/black	normal
HighLight: 15	15,0	white/black	bright
Inverse : 113	1,7	blue/grey	inverse
Flashing : 207	31,4	white/red	flash. inverse

Table 2. To accommodate the various IBM monitors, we need to assign real values to the screen attributes — these give a sensible on-screen address on each of the monitor/graphic card combinations.

DebtMaster—Parts Oops! and 8



Lindsay Ford is back with a Bonus — now you can backup your ledger. And, our apologies to all the apprentice DebtMasters who discovered there was something missing in their education ...

utility they once included on their System disks was scrapped after the Computer-In-A-Book model (for which DebtMaster was originally written). The result is that users of recent model MicroBees now have as much hassle with disk back-up as anyone else!

END.MWB

After numerous letters about this from people running DebtMaster on recent model 'Bees and from those who had converted it to other systems, I decided a fix was needed. The result was a utility that

Gaps in Parts?

MISSED PARTS of any of our YC Tutorials? Well, you've got a second chance — We'll forward photocopies of one to five parts for \$4 including postage and handling, and six and over parts for \$8 (overseas postage additional). Please identify the Tutorial by its complete name and Part number (if applicable). All but the latest of our Tutorials are listed in YC's Annual Index, published with our July 1987 issue: refer to the Services page on how to obtain Back Issues. □

THIS BONUS installment of the ultimate debtor program lets you make back-up copies of your ledgers. Those who have followed this series since it began in the November '86 issue, will realise that DebtMaster is one of the most potent debtor accounting systems available for small to medium sized businesses. But whether you've typed DebtMaster from the listings or paid \$500 for an alternative, the fact remains that you're entrusting your business records to data files. So if Fido decides that your debtors disk is as tasty as a doggy biscuit, you've lost the lot!

The best way to safeguard your records is to frequently back-up your working disk. This is great in theory, but unfortunately computer manufacturers work to the theory that 'life wasn't meant to be easy (for you)', so most back-up programs require at least a Ph.D. in Computer Science to operate. MicroBee was once an exception to this rule but the simple back-up

CHANGES TO "DEBT" PROGRAM (Part 1)

New line 56:
00056 GOSUB 128: RUN "END"

END PROGRAM

```
00001 REM ---- END ----
00002 POKE 140,1: CLEAR: STRS(22000): DIM A0(250),A1(250),A2(9),
A3(13),A4(9),B(9): FOR X=1 TO 9: A4$(X)="": NEXT X: K4$="":
K5$="*": K6$="***": REM Initialise variables
```

Check Disk Status

```
00003 T=0: GOSUB 84: ON ERROR GOTO 4: OPEN "I",6,"BASE.DBT": T=1:
REM Get Base file. Set T=1 if it exists, T=0 if not.
00004 ON ERROR GOTO 0: CLOSE 6
00005 ON ERROR GOTO 6: OPEN "I",6,"BACKUP.DBT": IN#6 ON: OUT#0:
OUT#0 OFF: INPUT K4$,K5$,K6$: IN#0: OUT#0: REM Get BACKUP
data file (default values of K4$,K5$ & K6$ set in Line 2)
00006 ON ERROR GOTO 0: CLOSE 6: IF K4$(<>)" THEN LET Y=1: K0$=K6$:
GOSUB 71: K6$=K7$: REM De-crypt password
```

Display Menu Text

```
00007 GOSUB 85: CURS 20,3: PRINT "<<< BACKUP DATA FILES >>>"\
"@@This program overcomes the hassles associated with making a"
```

Dear Dele

Conducted by Geoff May
For the Sydney dBase Users Group

The month's problem has to do with editing and saving dBASE III Plus files.

The system in use records the name of an individual and the date the entry was made. Just after the requirement of the user, the date of the entry was to be changed to the date of the entry.

The problem occurred when the user changed the date of the entry to a date later than the date of the entry.

To start we created a table with the following structure:

Structure for database: 1 table with the following structure:

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Structure for database: 1 table with the following structure:

Then create an index using the date field (RECREATE) and the future date (INDEX).

With this index in place the data base runs at 100%.

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```
00008 PRINT"@@back-up copy of your data files.@@You will need a@
formatted"@@disk which should be labelled "'DEBTMASTER@
BACKUP"'
00009 IF T=0 THEN CURS 19,9: PRINT [A28 42]\ SPC(20) "Program@
will not operate"\ SPC(19); "until DebtMaster installed"\
SPC(18) [A28 42]: CURS 0: PLAY 22,1; 0,30: GOTO 69: REM Don't
operate if DebtMaster base hasn't been installed (T=0)
00010 IF K5<>"* THEN 22: REM Force user to set BACKUP parameters
if this program hasn't been used before.
```

Set BACKUP parameters

```
00011 CURS 10,9: PRINT [A127 32]\[A127 32]\[A64 32]: CURS 26,9:
INVERSE: PRINT "INSTALLATION ": NORMAL: PRINT\ SPC(19);
"Current copy drive is: "; K5\ SPC(19); "Current Password
is:@@"; K6: REM Display BACKUP parameters
00012 CURS 23,14: PRINT "Press <ESC> to Abort": K1="B": GOSUB 75:
PRINT "Does your computer have 2 disk drives (Y/N)? *";
CHR(8); REM Get drive-name (Default value "B")
00013 GOSUB 81: IF X=27 THEN 2 ELSE IF K0="Y" THEN 16 ELSE IF
K0<>"N" THEN 13: REM Abort if <ESC> or set to "B" if
system has 2 drives.
```

```
00014 GOSUB 75: PRINT "What is the memory drive called (C, L or@
M)? *"; CHR(8); REM If single drive then let user set name
to "C", "L" or "M"
00015 GOSUB 81: K1=K0: IF X=27 THEN 2 ELSE IF K0<>"C" AND
K0<>"L" AND K0<>"M" THEN 15: REM Abort if <ESC>. Filter out
illegal drive-names.
00016 CURS 43,11: PRINT K1: GOSUB 75: PRINT "Do you want to use a@
Password (Y/N)? *"; CHR(8); REM Display new drive-name and
allow user to choose if he wants a password.
00017 K2="": GOSUB 81: IF X=27 THEN 2 ELSE IF K0="N" THEN
CURS 43,12: PRINT "****": GOTO 19 ELSE IF K0<>"Y" THEN 17
00018 G=1: GOSUB 76: IF X=27 THEN 2 ELSE IF K2<>" THEN
CURS 43,12: PRINT K2: "@@": REM Get Password and display it.
00019 GOSUB 75: PRINT "Is this correct (Y/N)? *"; CHR(8); REM Let
user check his inputs.
00020 GOSUB 81: IF K0="N" THEN 2 ELSE IF K0<>"Y" THEN 20 ELSE LET
Y=0: K0=K2: GOSUB 71: REM If OK then encrypt any Password
00021 GOSUB 84: OPEN "O",6,"BACKUP.DBT": OUT#6: PRINT "": K4:
" ", " ", K1: " ", " ", K7: " ": OUT#6: CLOSE 6: GOTO 2: REM
Save new BACKUP file and loop to start.
```

Display the Menu Options

```
00022 CURS 15,9: PRINT "Copy files onto Backup disk"; SPC(7); "<B>"\
SPC(14); "Copy files from Backup to Master@<C>"\ SPC(14);
"Exit without making Backup"; SPC(8); "<E>"
00023 IF K4<>" THEN CURS 25-LEN(K4)/2,13: PRINT "Last Backup@
on "; K4: REM Display date of last backup (if any)
00024 GOSUB 75: PRINT "Key? *"; CHR(8);
00025 GOSUB 81: PRINT K0: CURS 0: K1=K0: IF K0="E" THEN 69
ELSE IF X=16 THEN 11 ELSE IF K0<>"B" AND K0<>"C" THEN 24: REM
Get user's input. Allow him to reset parameters if <CTRL> <K>.
```

Backup prompt (Dual Disk Systems only)

```
00026 IF K5<>"B" THEN 28 ELSE GOSUB 75: PRINT "Is Backup Disk in@
Drive B (Y/N)? *"; CHR(8); REM Check Backup disk inserted if
using a two drive system.
00027 GOSUB 81: IF K0="N" THEN 2 ELSE IF K0<>"Y" THEN 27: REM
Abort if user gives illogical answer
```

Copy from Backup to Master Prompts

```
00028 IF K1="B" THEN 31 ELSE GOSUB 75: PRINT "Are you sure you@
want to copy ONTO your Master Disk (Y/N)? *"; CHR(8);
00029 GOSUB 81: IF K0="N" THEN 2 ELSE IF K0<>"Y" THEN 29: REM
Abort if user changes his mind
00030 G=0: IF K6=" THEN 31 ELSE GOSUB 76: IF K2<>"K6 THEN
GOSUB 75: CURS 20,16: PRINT "<<< INVALID PASSWORD >>>";:
CURS 0: FOR X=0 TO 9: PLAY 22,4; 1,4: NEXT X: GOTO 69: REM
```

dLouse!

dBase III Bug Reports

SET EXACT ON AND INOPERABLE INDEXES (1,1)

SET EXACT ON will set the

index to be exact when the

length of the key entered is

less than or equal to the

length of the key in the file.

Any key entered longer than

the key in the file will be

truncated to the length of the

key in the file.

One work around for this is to

use the SET EXACT OFF command

and then use the SET EXACT ON

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dCoder

Tips For The Weary dBase Traveller
(or)
Embellishing Your Programs

By Les Bell

When dBase comes across an

ampersand (&) it replaces it

with a space. This is a problem

if you are using the SET

EXACT ON command. The

SET EXACT ON command will

set the index to be exact

when the length of the key

entered is less than or equal

to the length of the key in

the file. Any key entered

longer than the key in the

file will be truncated to the

length of the key in the file.

One work around for this is to

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and then use the SET EXACT ON

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One work around for this is to

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and then use the SET EXACT ON

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DebtMaster

If Password (K6\$) set then ask for it. Display error then beep and abort if wrong entry (K2\$)

```
00031 IF K5$(">"B" THEN CURS 1,1: PRINT [A63 32] ELSE CURS 1,13:
PRINT [A13 32]: INVERSE: PRINT " DO NOT REMOVE DISKS OR@
TURN OFF POWER ": NORMAL: REM Display Caution if Dual Disk
```

File Backup Routine

```
00032 CURS 0: K2$=K5$+"": K3$="A": IF K1$="B" THEN LET K3$=K2$:
K2$="A": REM K2$=Source Drive, K3$=Destination Drive
00033 GOSUB 75: CURS 22,16: PRINT "Setting Directories": CURS 0:
DISKRESET K2$: DISKRESET K3$: REM Reset directories
00034 GOSUB 75: CURS 23,16: PRINT "Copying Data Files": CURS 0
```

Copy DATE.DBT file

```
00035 ON ERROR GOTO 74: OPEN "I",6,K2$+"DATE.DBT": IN#6 ON: OUT#0:
OUT#0 OFF: INPUT K0$,K1$,J,D,U: IN#0: OUT#0: CLOSE 6: IF
K2$(">"A": THEN LET D=0
00036 K4$=K0$: OPEN "O",6,K3$+"DATE.DBT": OUT#6: PRINT "'": K0$:
"',": K1$: "',": J: ",": D: ",": U: OUT#0: CLOSE 6
```

Copy BASE.DBT file

```
00037 OPEN "I",6,K2$+"BASE.DBT": IN#6 ON: OUT#0: OUT#0 OFF: FOR X=1
TO 9: INPUT B(X),A4$(X): NEXT X: IN#0: OUT#0: CLOSE 6
00038 OPEN "O",6,K3$+"BASE.DBT": OUT#6: FOR X=1 TO 9: PRINT B(X):
"',": A4$(X): "':": NEXT X: IN#0: OUT#0: CLOSE 6
```

Copy BACKUP.DBT file

```
00039 ON ERROR GOTO 40: X=0: OPEN "I",6,K2$+"BACKUP.DBT": IN#6 ON:
OUT#0: OUT#0 OFF: INPUT K4$,K5$,K6$: IN#0: OUT#0: X=1
00040 ON ERROR GOTO 0: CLOSE 6: IF X=0 THEN 43 ELSE IF D>0 THEN
LET K4$=K0$ ELSE 42: REM Alter BACKUP date (K4$) if not
copying from Backup disk to Master
00041 OPEN "O",6,K2$+"BACKUP.DBT": OUT#6: PRINT "'": K4$: "',":
K5$: "',": K6$: "':": OUT#0: CLOSE 6: REM Copy to Source
00042 OPEN "O",6,K3$+"BACKUP.DBT": OUT#6: PRINT "'": K4$: "',":
K5$: "',": K6$: "':": OUT#0: CLOSE 6: REM Copy to Dest.
```

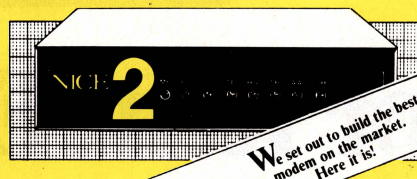
Copy BUSGRAF.DBT and BUSGRAF.BAK files

```
00043 Z=0: ON ERROR GOTO 44: OPEN "I",6,K2$+"BUSGRAF.BAK": IN#6 ON:
OUT#0: OUT#0 OFF: INPUT F1,K0$: FOR X=1 TO 64: INPUT A0(X):
NEXT X: Z=1: REM Load .BAK file (if any)
00044 ON ERROR GOTO 0: IN#0: OUT#0: CLOSE 6
00045 ON ERROR GOTO 46: KILL K3$+"BUSGRAF.BAK": REM Erase any .BAK
file on Destination disk
00046 ON ERROR GOTO 0: IF Z=0 THEN 48: REM Skip if no .BAK file
00047 OPEN "O",6,K3$+"BUSGRAF.BAK": OUT#6: PRINT F1: ",": K0$:
"',": FOR X=1 TO 64: PRINT A0(X): NEXT X: IN#0: OUT#0:
CLOSE 6: REM Copy to destination
00048 Z=0: ON ERROR GOTO 49: OPEN "I",6,K2$+"BUSGRAF.DBT": IN#6 ON:
OUT#0: OUT#0 OFF: INPUT F1,K0$: FOR X=1 TO 64: INPUT A0(X):
NEXT X: Z=1: REM Load .DBT file (if any)
00049 ON ERROR GOTO 0: IN#0: OUT#0: CLOSE 6
00050 ON ERROR GOTO 51: KILL K3$+"BUSGRAF.DBT": REM Erase any .DBT
file on Destination disk
00051 ON ERROR GOTO 0: IF Z=0 THEN 53: REM Skip if no .DBT file
00052 OPEN "O",6,K3$+"BUSGRAF.DBT": OUT#6: PRINT F1: ",": K0$:
"',": FOR X=1 TO 64: PRINT A0(X): NEXT X: IN#0: OUT#0:
CLOSE 6: REM Copy to destination
```

Copy Account Files

```
00053 GOSUB 75: CURS 26,16: PRINT "Copying File *": CURS 0: FOR
E=65 TO 90: Z=0: REM Loop through A.DBT to Z.DBT
00054 ON ERROR GOTO 56: OPEN "I",6,K2$+CHR(E)+".DBT": CURS 39,16:
PRINT CHR(E): CURS 0: IN#6 ON: OUT#0: OUT#0 OFF: REM Display
a prompt if file exists
00055 INPUT C: FOR X=1 TO C: INPUT A0(X),A1$(X): NEXT X: Z=1:
N=N+C: REM Get number of accounts (C) and load them.
00056 ON ERROR GOTO 0: IN#0: OUT#0: CLOSE 6
00057 ON ERROR GOTO 58: KILL K3$+CHR(E)+".DBT": REM Kill any file
of same name on Destination disk
00058 ON ERROR GOTO 0: IF Z=0 THEN 60: REM Skip if no such file on
Source disk.
```

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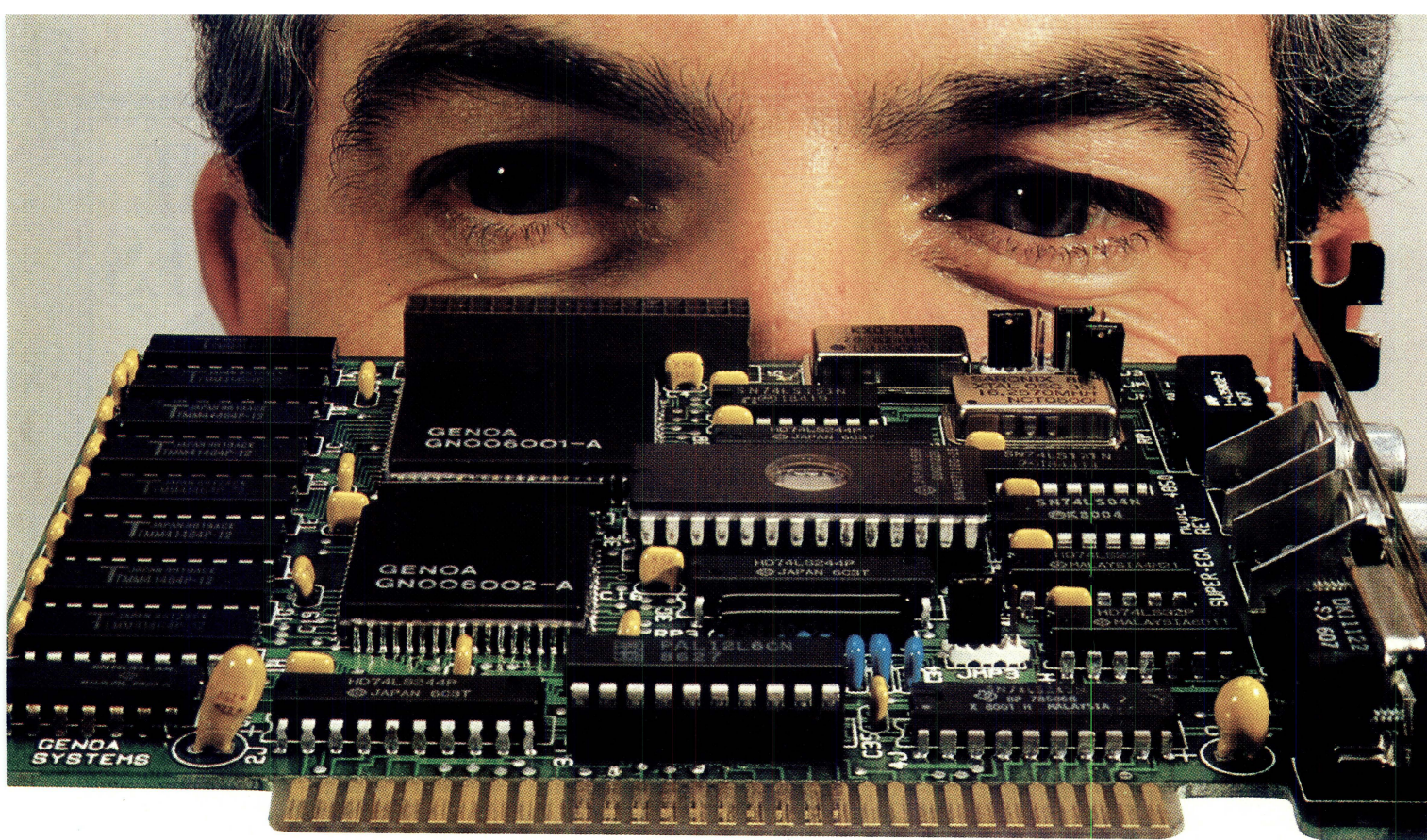
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DebtMaster

runs when you exit from the Main Menu (key <E>). Call it END.MWB, follow the rules for program entry described in Part 1. And — do all your testing on a spare copy of your Master disk (it can play havoc with your files if it isn't working properly).

The END program allows you to backup your data files, to read the files from a backup disk or to exit from DebtMaster without doing either. The date of the last back-up is displayed to warn you if your trust in ferro-magnetic storage is becoming dangerous. A password facility is included so you can stop your staff from accidentally copying outdated files from an old back-up disk onto your Master. When you enter the program one of several things will happen —

1) If you haven't set-up the Debtmaster Base, then the program will announce that it won't operate.

2) If you haven't used the Backup option before, then you'll be asked to INSTALL it. Two items need attention (you can press <ESC> to abort if required) —

COPY DRIVE: You'll be asked if your system has two disk drives. If you press 'Y' (Yes) then the program will assume that the backup disk will always be in drive 'B'. If 'N' (No) then you'll be asked if backups will be done in Drive 'C' (Computer-in-a-Book systems) or 'L' or 'M' (others). Press the appropriate key.

PASSWORD: The program lets you copy the data files on the Master disk onto the backup disk OR the data files on the backup disk onto your Master disk. The latter option is included in case some tragedy occurs to your Master disk and you want to reconstitute it by combining a copy of the original program disk and the data files on the backup. Your staff can really screw you up if they choose this by mistake, as the Master will then contain the files that were on it when the last backup was made. Tough luck if that was a month ago!

To avoid such disasters you can set a password (1 to 3 letters) that lets your staff make backups, but prevents them from copying from the backup onto the Master unless the password is entered. If you want to sleep at night, then press 'Y' and type something suitable (not your initials!!)

You will now be asked to verify what you have entered. Press 'Y' and it will be saved or 'N' if you've blundered. ▷

```
00059 OPEN "O",6,K3$+CHR(E)+".DBT": OUT#6: PRINT C: FOR X=1 TO C:
PRINT A0(X); ", '"; A1$(X); "'": NEXT X: OUT#0: CLOSE 6: REM
Save file to Destination disk.
00060 F1=FRE($): NEXT E: GOSUB 75: CURS 23,16: PRINT "Copying Paid@
Ledger": CURS 0: REM FRE($) is for crash-proofing.
```

Copy PAID.DBT file

```
00061 OPEN "I",6,K2$+"PAID.DBT": IN#6 ON: OUT#0: OUT#0 OFF: FOR X=1
TO U+2: INPUT A1$(X): NEXT X: IN#0: OUT#0: CLOSE 6: REM Load
Paid Ledger. U (from DATE.DBT) is number of entries.
00062 ON ERROR GOTO 63: KILL K3$+"PAID.DBT": REM Erase any file of
same name from Destination disk
00063 ON ERROR GOTO 0: OPEN "O",6,K3$+"PAID.DBT": OUT#6: FOR X=1 TO
U+2: PRINT "'"; A1$(X); "'": NEXT X: OUT#0: CLOSE 6: REM
Copy file to Destination disk
```

```
00064 REM )
00065 REM ) These lines reserved for backing up Bad Debtors
00066 REM ) ledger in the commercial version of the program
00067 REM )
```

Backup complete

```
00068 DISKRESET "A": GOSUB 75: CURS 27,16: PRINT "*** DONE ***":
CURS 0: PLAY 22,1: 0,10: IF D=0 THEN RUN "DEBT": REM Loop
to Menu if copied from Backup disk to Master
00069 GOSUB 85: CURS 6,8: PRINT "Enter: \" SPC(12); "TYPE PAID.DBT@
<RETURN> to view Paid Ledger"
00070 GOSUB 84: PLAY 0,30: POKE 140,0: CLS: SYSTEM: REM Exit to CP/M
```

MISCELLANEOUS SUBROUTINES

Encrypt/Decrypt Password

```
00071 K7$="": IF K0$="" THEN RETURN: REM Abort if no password
00072 FOR X=1 TO LEN(K0$): Z=ASC(K0$(X)): IF Y=1 THEN LET Z=Z-X
ELSE LET Z=Z+X: REM Add or Subtract counter (as appropriate)
to ASCII value of each letter in Password
00073 K7$=K7$+CHR(Z): NEXT X: RETURN
```

Defective Backup disk error message

```
00074 ON ERROR GOTO 0: OUT#0: CLOSE 6: GOSUB 75: CURS 20,16: PRINT
"<<< DEFECTIVE BACKUP DISK >>>": CURS 0: PLAY 22,1: 0,20:
DISKRESET "A": RUN "DEBT"
```

Clear prompt line

```
00075 CURS 1,16: PRINT [A63 32]: CURS 1,16: RETURN
```

Password Entry routine

```
00076 GOSUB 75: PRINT "Enter Password ***": CHR(8): CHR(8): CHR(8):
K2$="": FOR Z=1 TO 3: REM Display prompt and get keys
00077 GOSUB 81: IF K2$(">") AND (X=13 OR X=27) THEN NEXT Z 80 ELSE IF
X<65 OR X>90 THEN 77: REM Abort if <ESC> or <RETURN>, else
ignore non-ASCII.
00078 IF G=1 THEN PRINT K0$: ELSE PRINT "*": REM Display input only
if using program for first time.
00079 K2$=K2$+K0$: NEXT Z: REM Add key to password string
00080 RETURN
```

Key Input Routine

```
00081 X=ASC(KEY$): REM Clear key buffer
00082 X=ASC(KEY$): IF X>96 AND X<123 THEN LET X=X-32: REM Get key
and if lower case then convert to CAPITAL.
00083 IF X=128 THEN 82 ELSE LET K0$=CHR(X): RETURN: REM Loop if no
key, else display it.
```

Print "Wait" prompt

```
00084 GOSUB 75: CURS 30,16: PRINT "-Wait-": CURS 0: RETURN
```

Clear screen panel

```
00085 FOR X=3 TO 14: CURS 1,X: PRINT [A63 32]: NEXT X: RETURN
```

Part Oops!

PART 7 of the DebtMaster series (YC, Jun. '87) wound up, as Lindsay expressed it, 'with more holes in it than a Mafia pimp!' — the blame is ours — if we had a sub-editor, we'd shoot *him*. And our apologies to Lindsay who's back to fill the holes in your education...

To correct the omissions in Part 7, you'll have to add lines 107-117 that got left out of BUSGRAF, change a few lines in the PRI program (29-33) to interface it and try the DUMMY program (11 lines) if you want to test it — with these corrections in place, there should be no problems at all.

(C): If you've installed the backup program, you'll be confronted by a menu that lets you copy to a backup disk (Key), copy the backup disk onto the Master (Key <C>) or Exit without doing either (Key <E>). The menu will also display the date on which the last backup was made (this won't occur if you haven't yet made one). Make backups *at least* once a week.

Note: If you use Key <C> and a password is set, then you'll have to enter it. Its letters are not displayed as you type them.

You can change the copy drive or password allocation from the END Menu, but details are not included here as the article may be used as an instruction manual for staff. Refer to the program listing for details, then write them on a sheet of paper and put it somewhere safe!

Further instructions (principally on when to change disks) will be given by the program. Be warned — if you have a single drive system, then you'll soon envy those who have two — repeated disk changes will be required. □

MicroBee DebtMasters...

If you want the ultimate debtor control program without the hassles of typing 40K of code, then don't despair. You can get DebtMaster V1.8 (MicroBee computers only) from Lindsay Ford at Dreamcards Software, 8 Highland Crt, North Eltham 3095, Vic. (Credit Card Orders Tel: (03) 439-4467) for \$54.95 + \$10.99 tax (Blast Mr Keating!) + \$2.00 P&P. It contains heaps of enhancements, including an automatic disk back-up system and inclusion of work categories in the graph routine, a bad debtors ledger, file statistics, improvements to the SEARCH facility and lots more. Send SSAE for a list of other MicroBee software. □

LINES OMITTED FROM "BUSGRAF" (107-117)

Print highlighted key selection on menu

```
00107 CURS 44,X: INVERSE: PRINT "<"; K0$; ">": NORMAL
CURS 1,12: PRINT [A127 321: CURS 0: RETURN
```

Clear section of screen

```
00108 FOR X=3 TO 14: CURS 1,X: PRINT [A63 321: NEXT X: RETURN
```

Display graph commencement date

```
00109 CURS 38,5: PRINT "Graph begins on ";: IF K5$="" THEN
PRINT "(Not Set)" ELSE PRINT K5$
00110 RETURN
```

Set J=Number of days since 1/1/84

```
00111 X=N: IF X<84 THEN LET X=N+100
00112 J=(X-84)*365+INT(FLT(X)/4)+L-1: IF M=1 THEN RETURN
00113 RESTORE 121: FOR X=1 TO M-1: READ Z: J=J+Z: NEXT X: IF
FRACT(FLT(N)/4)=0 AND M>2 THEN LET J=J+1: REM Add
months and allow for Feb. in leap years
00114 RETURN
Set L=Day, M=Month, N=Year from date string (K0$)
```

```
00115 L=INT(VAL(K0$)): X=SEARCH(K0$,"/"): K0$=K0$(;X-1)
00116 M=INT(VAL(K0$)): X=SEARCH(K0$,"/"): K0$=K0$(;X-1)
00117 N=INT(VAL(K0$)): RETURN
```

CHANGES TO "PRI" PROGRAM (see Part 4)

New line 29;

```
00029 GOSUB 89: RUN "BUSGRAF"
```

Delete lines 30 to 33 inclusive.

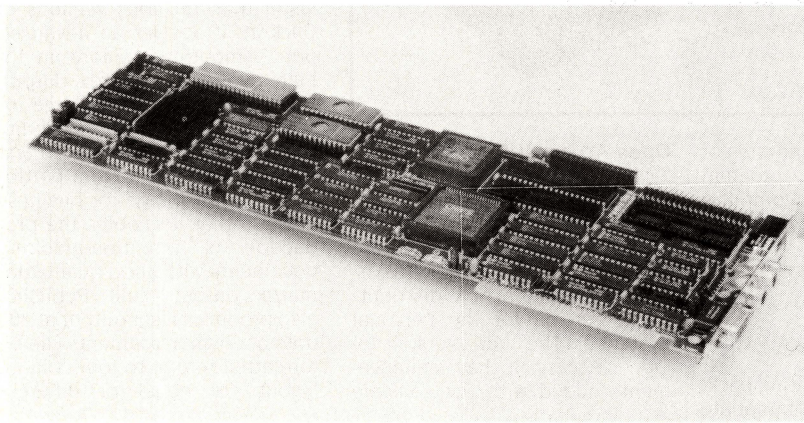
DUMMY PROGRAM (Creates a dummy Paid Ledger so you can test BUSGRAF)

```
00001 REM ---- Create "Dummy" Paid ledger ----
00002 OPEN "I",6,"DATE.DBT": IN#6 ON: OUT#0: OUT#0 OFF:
INPUT K3$,K4$,P,D,U: IN#0: OUT#0: CLOSE 6: REM Load
existing date file (U=Number of Paid Ledger entries)
00003 OPEN "O",6,"DATE.DBT": OUT#6: PRINT "'': K3$; "'',''";
K4$; "'',"; P; ", "; D; ",52": OUT#0: CLOSE 6: REM Save
new date file with "full" Paid Ledger entry counter.
00004 OPEN "O",6,"PAID.DBT": OUT#6: PRINT "'':
PRINT "'': REM Open new Paid Ledger and print two
dummy heading lines
00005 F1=8000: FOR M=1 TO 12: W=5: IF M>2 AND M<11 THEN LET
W=4: REM F1=Initial amount. W=Number of entries per
month (allows total in 12 months to = 52).
00006 FOR Y=1 TO W: D=Y*7-6: K0$=STR(D): K1$=STR(M):
K2$=K0$(;2)+"/"+K1$(;2)+"/87": REM Spread day (D)
fairly evenly across each month. K2$ is date string.
00007 F1=F1-220: IF M>6 THEN LET F1=F1+440: REM Make graph
decline to end of June, then increase.
00008 F0=F1+FLT(Y)*80: IF M=2 THEN LET F0=1500: REM Add a bit
so graph not too even. Fix amount for February.
00009 IF (M=4 OR M=10) AND Y=W THEN LET F0=8400: Add Peaks
00010 K0$=STR(F0): PRINT "'': K2$; SPC(20); "$"; K0$(;2);
"'': REM Make ledger entry (F0 is the amount).
00011 NEXT Y: NEXT M: PRINT: OUT#0: CLOSE 6: STOP
```


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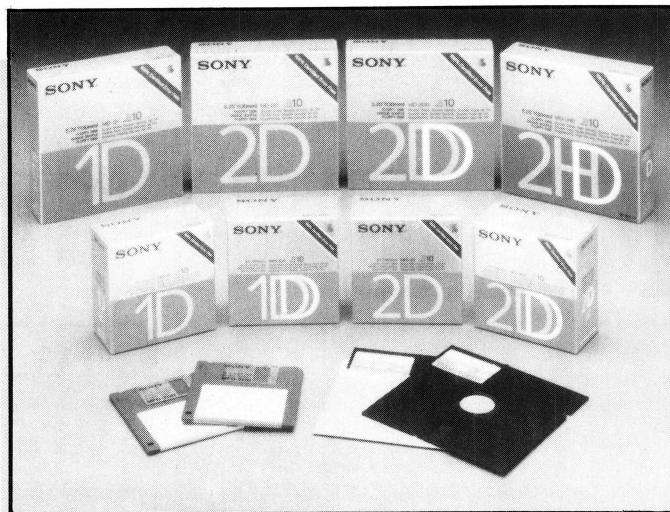
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Although computers enable us to create documents quickly, the dreaded crash still causes us to break out with a sweat. PC Plus has come out with a Bookmark (no books around though) which saves your work automatically while you work. If the system crashes you are returned back to the spot you were at before the crash when you restart. A nifty feature is that the you get to choose how your work is saved, either by the number of keystrokes or the length of time you have been at that document. An example would be that a program can be activated to record



at a rate of every two minutes or 1,000 keystrokes. The program would be perfect for computer novices who crash the system every so often.

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Open Access II for PS/2

Software Suppliers

Phone: (02) 888 1955

Price: \$1063

Like many companies that are following the new range of IBMs, Open Access are now distributing a version for the Personal System/2. The new version of Open Access II has enhancements added with the software

supporting all of the IBM graphics modes including the 640 x 480 — 2 and 16 colour, and 320 x 200 — 56 colour.

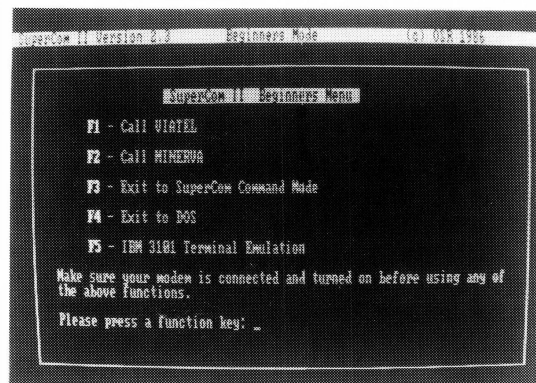
PFS:First Publisher

Imagineering

Phone: (02) 697 8666

Price: \$192

This software desktop publishing package is an extensive upgrade of ClickArt Personal Publisher, both of which are from US company, Software Publishing Corporation. First Publisher prints and handles text three times faster than previous versions of ClickArt. It applies an advanced print 'smoothing' algorithm for high quality dot matrix output. New features of the package include fat-bit editing, the ability by the package to easily read text and separate art and font portfolios. The advantage for business users is that it enables the production of attention-grabbing documents with good quality dot matrix output. First Publisher also produces laser output at 300 dots per inch. Documents can be formatted in one to four column layouts of equal or different



Supercom Executive

PC Extras

Phone: (02) 319 2155

Price: \$199 inc tax

A new communications package, Supercom Executive, provides completely flexible facilities for automated, unattended information gathering. Redialling an overcrowded bulletin board is made simple using Supercom, as the software does all the dialling. It signals when it has succeeded. The other major use is for unattended information gathering. Supercom can be instructed to

dial up a remote system, at a particular time, log into the system, gather and store data, then log off again. Both Viatel and communications facilities are available on Supercom. Also incorporated is a remote control facility. The Photostat facility supersedes conventional CTTY facilities provided on programs such as Crosstalk. Programs such as dBase, WordStar and Lotus cannot be accessed remotely under CTTY, but will run under Photostat. □

widths and ASCII documents up to 99 pages long can be imported. Graphics can be resized, inverted or flipped. Current registered owners of ClickArt can purchase First Publisher for a nominal fee by contacting Imagineering.

New Machines

Brother EM-2000

Brother Industries (Aust) Pty Ltd

Phone: (02) 887 4344

Price: \$3895

The latest in office automation from Brother, the EM-2000 is a wordprocessor which, the company claims, operates as easily as a typewriter. The EM-2000 has 36 kilobytes of memory, which is expandable to 132 kilobytes and a 16-bit central processing unit. It has a full display screen. An option for the EM-2000 is a communications package that incorporates the printer, terminal and typewriter in the unit. The EM-2000 is then capable of file transfer, terminal emulation and modem connection to access other computers. The daisy wheel typewriter workstation includes a memory backup, enabling the machine to return to its previous status when it is turned on. A background printing function allows for editing of documents while the machine is printing. The EM-2000 has a number of options available, in-

cluding an external disk drive, cut sheet paper feeder and tractor feeder, and a data file enhancement to the existing mail merge function. A conversion program for easy document transfer from other memory typewriters is a standard feature.

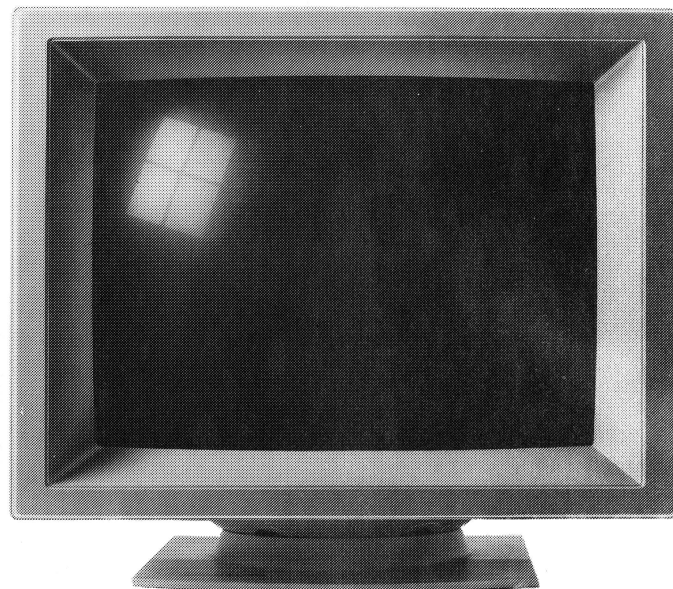
Multispeed

NEC Information Systems

Phone: (02) 438 4355

Price: Not supplied

A portable computer that is purported to have all the processing power of the average business personal computer has been released by NEC. Known as Multispeed, it can run industry standard IBM software or builtin packages. The Multispeed is able to process information at the standard 4.77 MHz, switchable to 9.54 MHz. The screen features an 80 column by 25 line super-twisted liquid crystal display screen, 640K RAM, a full size PC/XT compatible keyboard complete with numeric keypad, standard function keys and an interactive help key. There is also an additional Pop Up key which allows a series of menus to be windowed at any time while an application is running. This provides access to integrated office automation software. The Multispeed has five software applications designed to simplify work and increase efficiency. An outliner processor and text editor allows the user to prioritise points, link text to those points and edit and move



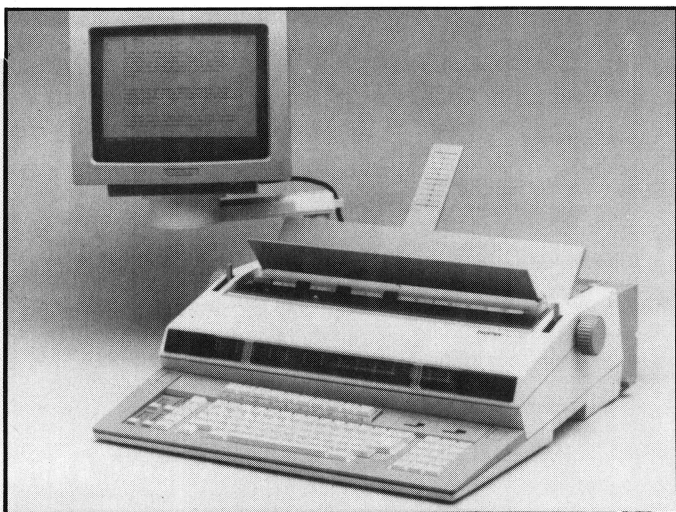
THIS MONITOR COULD PUT US OUT OF BUSINESS.

The NEC MULTISYNC colour monitor is so advanced it will probably never need to be upgraded. That means once you've bought one, you'll possibly never need to replace it.

You see the MULTISYNC automatically scans all frequencies between 15.5kHz and 35kHz - which includes every colour graphics board now in use. And it adjusts itself to suit, with a maximum resolution of 800 (horizontal) by 560 (vertical). It's also compatible with IBM PCs. And all IBM compatibles.

In layman's terms this simply means that the MULTISYNC not only has a superior clarity of display. And superior database applications. But with MULTISYNC, when the time comes to upgrade your computer, you won't have the added expense of changing over your monitor.

Now despite the fact that we call the MULTISYNC the 'intelligent' monitor, it may not be the most intelligent business move we've made. However we're sure the MULTISYNC will keep you ahead of everyone else for a long time to come. To find out more telephone (02) 868 1811.



MULTISYNC

NEC

NEC HOME ELECTRONICS

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Brisbane (07) 277 0888; Adelaide (08) 294 9033; Perth (09) 445 3499.

NEC484/87 USPNeedham

NEW PRODUCTS

major and subordinate topics with minimal keystrokes. The Notepad program is a fully functional word processor with an builtin 20,000 word dictionary. The telecommunications standard is Telecom which supports the XModem protocol. Parallel, RS232, CRT and FDC ports are standard. With the new standard of media being 3 1/2 inch the Multispeed has two inbuilt 3 1/2 inch disk drives which can operate as external drives for for the IBM machine that makes file transfer between 3 1/2 and 5 1/4 inch media.



Laser 128

Video Technology Pty Ltd

Phone: (03) 614 1644

Price: \$995 taxed

Aimed at the home education market, the Laser 128 microcomputer is an Apple-compatible machine. It has an expansion slot that can be expanded into two by utilising the optional two-slot expansion box. The Laser 128 has both parallel and serial printer interfaces, as well as total RF-interference protection and complete CMOS technology. The keyboard has function keys and a numeric keypad. Full RGB digital video output and PAL video output are available. The Laser 128 will operate most of the software written for the Apple II series, including Appleworks and Pascal. Video Technology claims that the Laser 128 is small enough to allow it to be easily transported. A range of peripheral products, such as disk drives, are also available.



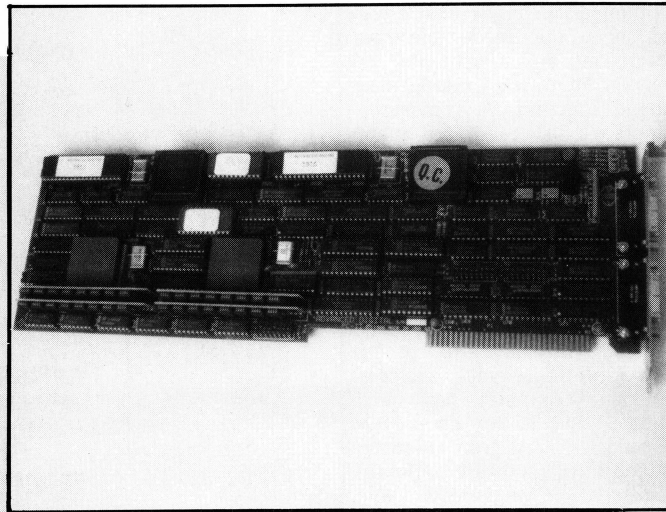
PCII Networking Board

Awanet

Phone: (02) 360 2822

Price: \$2495

Awanet have come up with a solution to those companies needing to expand but not being able to afford to have standalones dotted around the office. The new board allows users of an IBM PC/AT or compatible to transform the computer into a



Wang PC 200/300 Series

Wang Computer Pty Ltd

Phone: (02) 925 5678

Price: See below

Wang have introduced the PC 200/300 series of personal computers which can be used as work stations in a Wang network or as standalones. They are claimed to be completely hardware and software compatible with the IBM AT. The new PCs, the PC 280 and PC 380, are based on 80286 and 80386 microprocessors using MS DOS 3.2 as the operating system. Both computers use the same 8-slot chassis, so that upgrading from a PC 280 to a PC 380 means simply replacing the system board. The systems use the same monitor, option cards and storage devices. They come standard with a 1.2 megabyte disk drive with a controller for up to two floppy disk drives and two hard disks, and a multi-mode video controller that supports the Hercules monochrome adap-

multiuser multiprocessor system supporting two or more extra workstations. The board is a high speed 16-bit processor, which clocks in at 8 MHz. It has two 512 kilobyte banks of memory, 2 Kbyte of dual port networking memory and a priority interrupt controller. The board works in conjunction with PC-DOS 3.1 and PC-NET 1.0 and allows complete network services with shared data access communications between users. To turn it into a three users system you need to acquire two low-cost video displays and keyboards, which will run on the boards sharing the same software from the central system. ▴



T1100 Plus

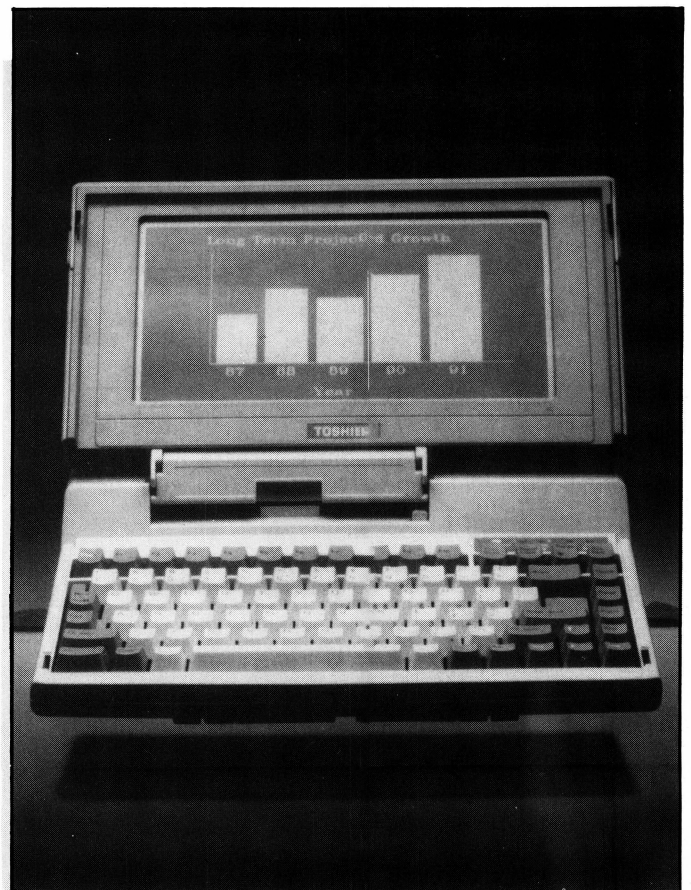
Toshiba (Australia) Pty Ltd

Phone: (02) 887 3322

Price: \$3995

Toshiba has announced an upgrade to the T1100 Plus portable personal computer. It now includes a blue screen for improved clarity and an increase in memory capacity. Using super-twisted technology, the liquid crystal display screen now features dark blue alpha numerics on a grey background. The new model has MS DOS 3.2 as its operating system. Also, the size of the RAM has been increased from 256 to 640 kilobytes. Based on an 80C86 processor, the

T1100 Plus offers switch selectable, dual speed operation to run at 7.16 or 4.77 Mhz and is fully compatible with the IBM PC/XT or compatibles.



Peripherals and Extensions



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MSYC 002

tomatically select the right mode for emulation and the Vega also includes menu-driven software to allow system configuration.

Turbo Monochrome Graphics Card

Electronic Solutions

Phone: (02) 427 4422

Price: \$175

The Turbo Monochrome Graphics Card improves the performance of IBM PCs and compatibles by speeding up scrolling and writing to screen by at least four times. Slow scrolling is a problem with some graphics based wordprocessing packages and many of the new desktop publishing packages. The board is very complex electronically but most of the new technology has been built into one gate array chip. As a result, the board will fit in a 'short slot' of any PC on the market. The card is fully Hercules Graphics compatible and runs all existing graphics based software.



OmniLaser Series 2000

Texas Instruments Aust. Pty Ltd

Phone: (02) 887 1122

Price: See below

Texas Instruments has released a new family of laser printers, the OmniLaser Series 2000, which it claims is unrivalled in perform-

ance and reliability. The Series consists of three printers, the 2015, 2108, and 2115. Intended for high quality, high volume wordprocessing, the 2015 also has limited graphics. It prints 15 pages per minute and has a large paper handling capacity. The 2015 has a machine life of approximately 1.5 million pages and a duty cycle of 1,000 pages a day.

Both the 2108 and 2115 models incorporate the PostScript page description language, to ensure that users will be able to take advantage of software programs written for desktop publishing, CAD, word processing, and graphics applications. They are designed to integrate text, graphics and scanned images on the same page. All three OmniLaser models have plug in font modules with over 30 type styles. Font styles can be changed while printing a document under program control, or by printing the printer control panel. A 16 character liquid crystal display gives additional details about the printer's status. Control switches on the front panel switch the printer between portrait and landscape print orientation, on and off line, switching between the upper or lower paper tray, selecting fonts, and forcing the printer to advance to the next sheet of paper. These switching commands can also be handled by software commands. All models use Ricoh print engines with TI proprietary controllers. According to TI, the Ricoh second generation engine has improved paper handling, prints more copies over its life, and has a much higher duty cycle.

The OmniLaser Series is aimed at shared resource and high end, individual workstation markets. TI and WordPlex Australia Pty Ltd have announced a value added reseller agreement, allowing for WordPlex to sell its computer systems packaged with the latest OmniLasers. All three new laser printers are compatible with high end word processors and stand alone PC systems from Wordplex. The OmniLaser Series starts at \$11,370 including tax for the 2015, with the 2108 priced at the recommended retail price (RRP) of \$11,370 and the 2115 costing \$16,500 (RRP). □

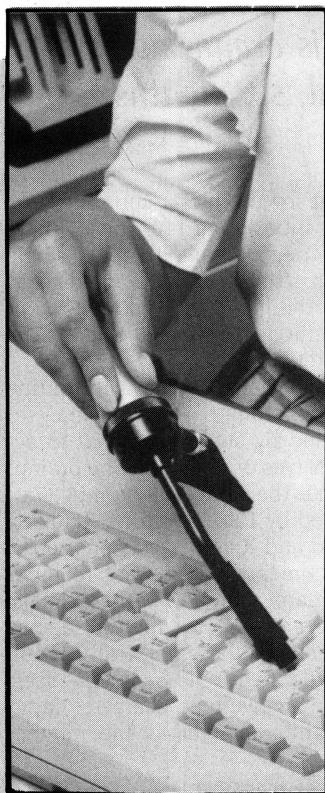


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Miscellaneous



Mini Super Cleaner

Sylex Ergonomics

Phone: (02) 647 2888

Price: Not supplied

After using a keyboard for a while, you may be shocked to find some yet to be discovered creatures suddenly crawling out from the keyboard or falling out when you tip it upside down. In the true spirit of ghost busters, Sylex have come up with a vacuum cleaner for the keyboard which sucks in the nasties. The cleaner comes complete with a range of attachments (no nuclear hyper drive, but!). There are two extension arms, a brush head, a nozzle and a re-usable dust collection bag. It is powered by two AA batteries and can blow a jet of air.

Postpak

Australia Post

Phone: (03) 669 7178

Price: See below

The saying goes; through sleet, rain and snow the postman always delivers. At least something

along those lines. For those of us who have had to send floppy disks by post, the problem has always been one of getting the thing to its destination in one piece! No more will we have to spend hours wrapping up the disk, as Australia Post has developed a Postpak especially for floppies — with a warning to keep the container away from magnetic fields, x-rays, and electricity. With measurements of 145 x 145 x 12 mm, the corrugated cardboard mailer offers sturdy packaging for the transmission of up to five floppy disks or one music compact disks (for those who get sick of mailing floppies!). These nifty little containers can be purchased from all Post Offices for 70 cents each, though there are substantial discounts for carton lot purchases.



BACK⁴UP

ESSENTIAL DATA DUPLICATOR

Back up your copy-protected disks with **ESSENTIAL Data Duplicator 4 PLUS** ■

EDD 4 PLUS is new technology, not just 'another' copy program. The **EDD 4**

PLUS program uses a specially designed hardware card which works with your disk drives to back up disks by accurately copying the bits of data from each track. Don't be fooled... no other copy-program/system for Apples can do this! ■ In

addition to backing up disks, **EDD 4**

PLUS includes several useful utilities such as examining disk drives, certifying disks, displaying drive speed rpm's, plus more!

■ **EDD 4 PLUS** runs on Apple II, II Plus (including most compatibles), and IIe, and is priced at \$190.00 (duodisk/ unidisk 5.25 owners must add \$32.00 for a special cable adapter). ■ A standard

EDD 4 version which doesn't include any hardware is available, and can be used on Apple IIc and III (using emulations mode) and is priced at \$125.00.

■ Bankcard and Master card accepted by phone. Add \$3.00 to all orders for postage and handling.

All orders must be prepaid.

UTILICO SOFTWARE

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WARNING: EDD is sold for making archival copies only

Give Your Programs A Good Start

One of the secrets behind writing 'friendly' Basic programs is organisation — before you start. David Mellefont shows how it's done. (And, six months later, you won't need to remember how and what that program does.)

YOU HAVE A great idea for a program but where to start? You'll want the program to be 'user friendly', at least, so that you'll still be able to operate it a year from now. Perhaps a menu of all the options would be best?

Now what about instruction? You'll need prompts to know what to do next. And error messages for the inevitable incorrect input. Speaking of inputs how will you handle those? Such a lot to think about and you haven't even got down to the main thing — your idea. Well, here is a set of routines to get you off to a good start.

The accompanying program is a self contained and general purpose base from which your program can be built. Although written in Microworld Basic for the Microbee, it can be adapted to other Basics fairly easily.

The Program

The program is structured for speed of execution. Sub-routines which are used frequently are placed at the front while the overheads such as dimension statements are placed at the end. The sub-routines have been written with single line spacing for compactness. For your own program development, a line spacing of 10 is recommended to allow for easier program changes. There is ample space for your own code between lines 1010 and 9990.

After entering the code, run the program and you'll see a title screen for a few seconds before the menu is displayed. Substitute your own title in line 10110 and your name in line 10130. The CURS statement will have to be modified to keep the title screen centred.

The menu is generated by a sub-routine so that an hierarchy of menus can be set up. The lines 980 to 1004 show how the menu is set up. The menu is given a title by the first DATA statement. Each menu option is given by the remaining DATA statements. Up to nine menu options can be specified. The number of options is set in the sub-routine call in line 1000 and the appropriate DATA statements are specified by the RESTORE 980. Line 1001 directs program control to the code for each option. In this case, all options go to line 9000 which displays a message to the effect that the option has not been set up.

The menu display sub-routine, starting at line 200, reads the menu title and displays the number of options specified by input variable, X. A single key input of the option number is returned in X for subsequent branching.

The input for the menu sub-routine is handled by sub-routine 110. This displays a prompt (string Z0\$) and accepts a single key input in string Z1\$. If parameter X is not-0, then the input is not accepted unless the input is between 0 and 9. The number is returned in X.

This routine is also used by sub-routine 190 after the prompt 'Press any Key to Continue' and by sub-routine 120 to accept a Y or N (yes or no) input. The prompt string Z0\$ has the additional prompt '(Y or N)' appended by 120. On return, X=0 if N was pressed and X=1 if Y was pressed.

At other times you will want to input numbers greater than 9 or with decimals. Sub-routine 130 accepts input initially as a string then puts the numerical value in the real variable A0. This avoids Basic querying an inadvertent character input but treats the character as the number zero. ▶

```
00009 REM --- Go To Initialisation ---
00010 GOTO 10000

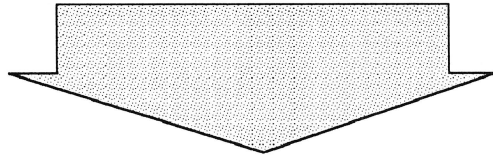
00099 REM --- Clear Command Line ---
00100 CURS 1,16:PRINT [A63 32];
00101 CURS 1,16:RETURN

00109 REM --- Key Input Routine ---
00110 VAR(X,Z0$)
00111 GOSUB[Z0$] 140
00112 Z1$=KEY: IF Z1$ = "" THEN 112
00113 IF X=0 THEN 116
00114 IF ASC(Z1$)<48 OR ASC(Z1$)>48+X
      THEN PLAY 24: GOTO 111
00115 X=INT(VAL(Z1$))
00116 GOSUB 100: RETURN

00119 REM --- Choose Yes or No ---
00120 VAR(Z0$)
00121 Z0$=Z0$+" (Y or N)"
00122 GOSUB[Z0$] 110
00123 IF Z1$="Y" OR Z1$="y": X=1: RETURN
00124 IF Z1$="N" OR Z1$="n": X=0: RETURN
00125 PLAY 24: GOTO 122

00129 REM --- Input Value Routine ---
00130 VAR(Z0$)
00131 GOSUB[Z0$] 140
```


A lesson in Desktop Publishing from President



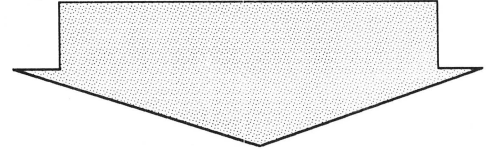
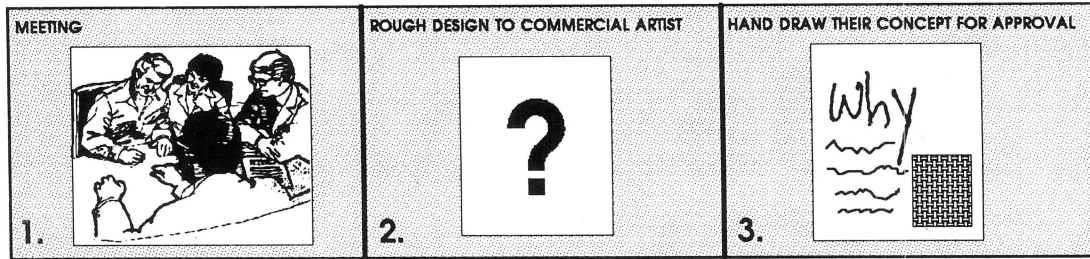
Desktop Publishing is the most significant advancement in the computerized world today. President have composed the following information on Desktop Publishing to inform you what D.T.P. is really all about and reading this, perhaps you will have more appreciation on how D.T.P. can decrease your costs, improve the quality of every day documentation, reduce turn around time and improve productivity in your company's printing requirements. Also most importantly you will understand how Desktop Publishing works.

How is conventional company printing achieved? Well, first you form an idea for a promotion, advert or document. This might be settled on in a meeting in which an advertising agency is called in, the idea is discussed and the agency goes away and translates this into a "rough layout" which is brought back to you for approval. Once approved, the agency then has graphic designers produce the graphics and typesetters set the text, and the page layout is finished. The layout then comes back to you again for proofing and correction, final changes are made by the agency. When this time consuming process has been completed, and again approved by you, bromides or metal plates are made if necessary, then the finished layout goes to an offset printer for reproduction. However with Desktop Publishing this could have all been done in house at a fraction of time and cost.

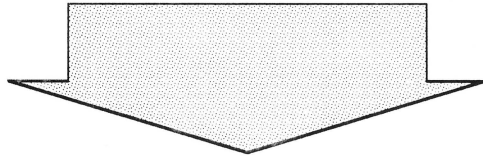
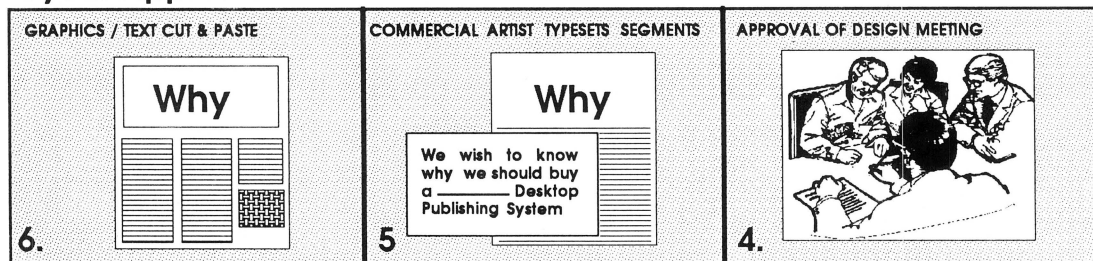
turn the page

Old steps and procedures

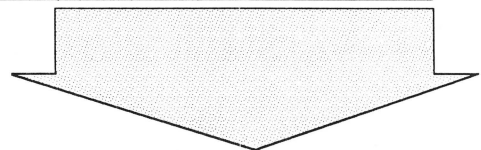
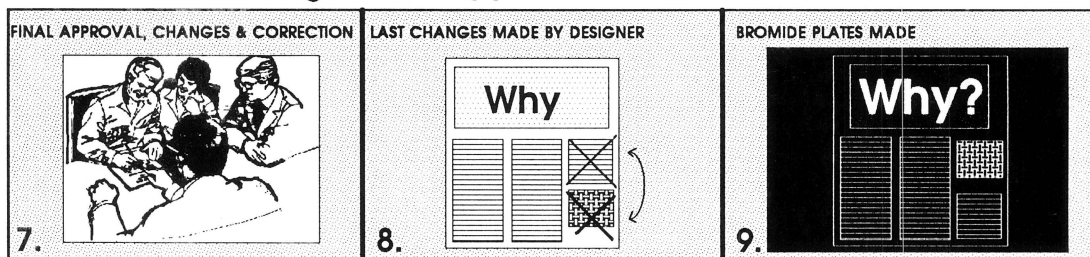
The Idea.



Layout Approval



Final Artwork changed and approved.



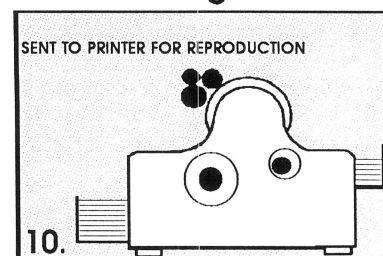
All steps render transport and courier costs, to and from each stage.

Management time wasted

Commercial Artist costs.

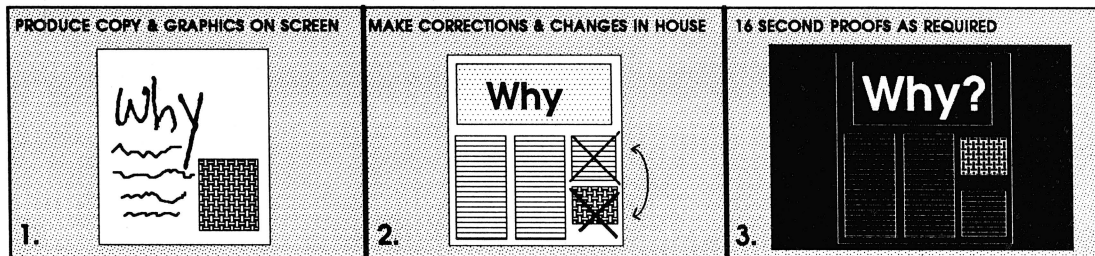
Typesetting costs etc. etc.

Await Printing



In house publishing

Procedure



All steps in house

All approvals in house

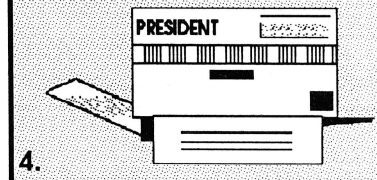
Minimum time loss

Last minute changes made

Cost savings 40 to 70%

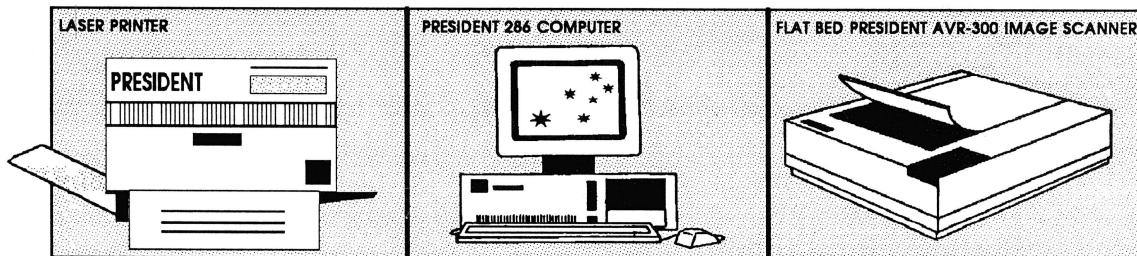
Result

LASER PRINTOUT 300 D.P.I. IN UNDER 10 SEC.
SHORT RUNS IN HOUSE, OR PRODUCE COPY
FOR METAL PLATES FOR LONG RUNS.

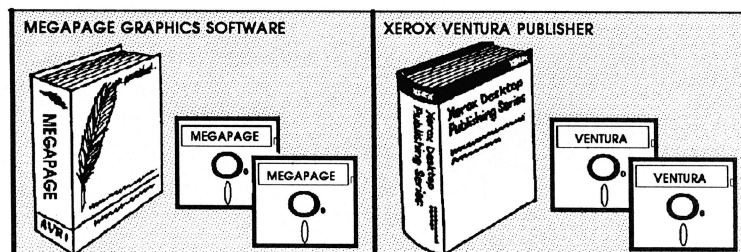


President MegaPage IV "the complete system"

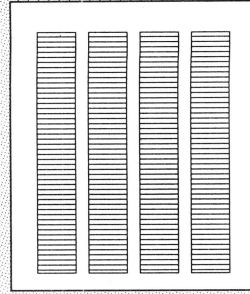
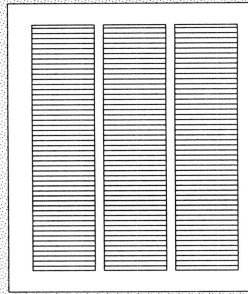
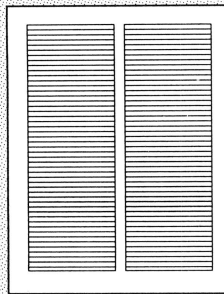
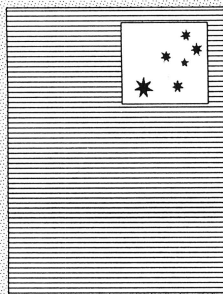
Hardware



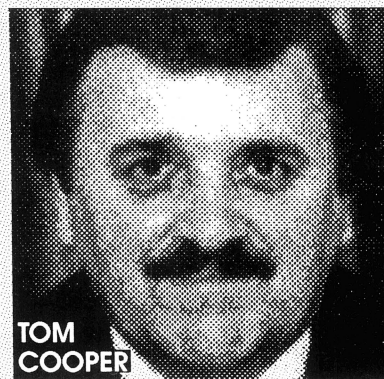
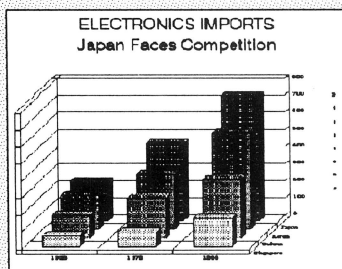
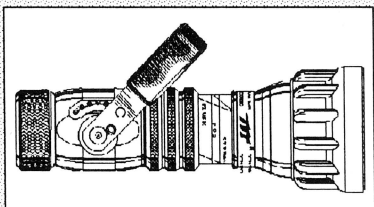
Software



21 STYLE SHEETS TO CHOOSE FROM OR YOU CAN DESIGN YOUR OWN.



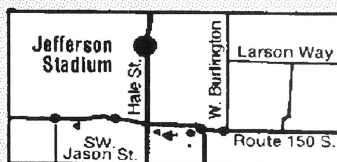
CAD DRAWING OR LOTUS GRAPHS CAN BE CAPTURED AND INCORPORATED, ALSO COLOUR PHOTO'S CAN BE SCANNED.



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SHOW SOME SPIRIT !



Attention:
Come to bat for your co-workers

SHOW SOME SPIRIT !

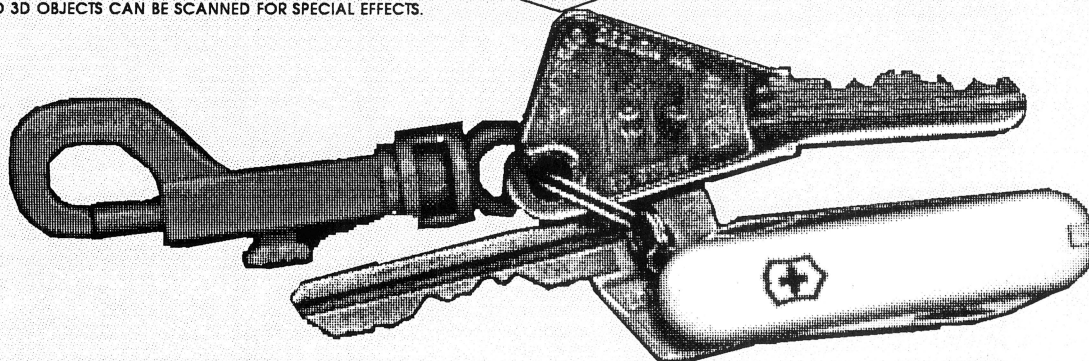
Your company baseball team comes up against some stiff competition this season. Join the gang and cheer them on 7 p.m. every Thursday in May and June

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May 14 vs. Globe Glass and Mirror
May 21 vs. Emerson's Auto Supply
May 28 vs. Byerly Pipe and Plumbing

June 4 vs. Lou Centucci Pizzeria
June 11 vs. Raber's Printing
June 18 vs. Olro's Floor Covering
June 25 vs. Lavery Electronics

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Why Desktop Publishing

- Less steps to produce a finished document.
- Encourages experimentation & promotes individual creativity.
- Reduce turn around time to create a document and circulate it.
- In house control on all steps
- Reduce costs in -
 - Development time
 - Personnel
 - Equipment

Why XEROX Ventura Publisher

- Full Wysiwyg
- Accepts files from -
 - ASCII & most Word Processors
 - More than 500 graphics packages
 - President A.V.R. Scanner
- Professional Style Sheet Facility
- Automatic Index and Table of Contents
- We choose Ventura 1.1 because we think its simply the best

Why MegaPAGE

- Total graphics control
- Five Levels of Zoom
- Editing Graphics/Text to individual Pixel level 300 DPI
- 10 Seconds output to Laser printer for whole A4 full page at 300 D.P.I.
- Incorporate text using more than 800 available fonts
- Fax Interface on board
- Scan directly into Ventura
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If an integer was required, sub-routine 170 is used in which case only the integer part of the number input is accepted and returned in X. Parameter Q, if not-0, is used to limit the integer to a value between 0 and Q.

That's the string input. In most cases, it is advisable to limit their length so that sensible formatting of either screen or printer output can be made.

Now, you don't want to have to remember these limits or use wordy prompts. So — sub-routine 150 prints prompt Z0\$ followed by the appropriate number of stars (*) as given by parameter Q. The cursor is backspaced to the first * ready for the string to be input. Although this does not really stop a longer string being input, the string Z1\$ is truncated to the right length in line 155. For other Basics use —

```
Z1$=LEFT$(Z1$,Q).
```

In making a program user friendly, consistency is most important. You need to know where to look for prompts and and where you currently are in the menu hierarchy. A screen heading can be displayed using sub-routine 160. The heading in Z0\$ is centred and underlined on the first line of a blank screen. You should use this feature at the start of the code for each menu or sub-menu item.

For program inputs and general prompts and messages, the last line on the screen is used (for the Microbee, line 16). Subroutine 100 clears the command line ready for any messages by printing 63 spaces. The last (64th) character on the line cannot be used otherwise an automatic line feed would result together with the scrolling upwards of the screen. Sub-routine 140 is used to display a prompt or message on the command line.

One frequently used message is to 'Press any Key to Continue' which is set up by sub-routine 190. To highlight errors, another sub-routine at line 180 is provided which causes a beep as the message is displayed. The message remains on the screen for two seconds as a result of the PLAY 0,16 in line 182. If your Basic does not support sound (in this case zero sound) then put in a dummy FOR loop to create the delay. ▷

```
00132 INPUT " Z1$;: A0=VAL(Z1$)
00133 GOSUB 100: RETURN

00139 REM --- Display Prompt ---
00140 VAR(Z0$)
00141 GOSUB 100: PRINT Z0$;
00142 RETURN

00149 REM --- Input String ---
00150 VAR(Q,Z0$)
00151 GOSUB[Z0$+" "] 140
00152 FOR U=1 TO Q:PRINT CHR(42);:NEXT U
00153 FOR U=1 TO Q+1:PRINT CHR(8);:
NEXT U
00154 INPUT " Z1$;
00155 IF LEN(Z1$)>Q: Z1$=Z1$(:1,Q)
00156 GOSUB 100: RETURN

00159 REM --- Display Heading ---
00160 VAR(Z0$)
00161 CLS:UNDERLINE:CURS 32-LEN(Z0$)/2
00162 PRINT Z0$): NORMAL
00163 RETURN

00169 REM --- Input Integer ---
00170 VAR(Q,Z0$)
00171 GOSUB[Z0$] 130: X=INT(A0)
00172 IF X<0 OR X>Q: PLAY 24: GOTO 171
00173 GOSUB 100: RETURN

00179 REM --- Display Error Message ---
00180 VAR(Z0$)
00181 GOSUB[Z0$] 140: PRINT CHR(7);
00182 PLAY 0,16:RETURN

00189 REM --- Press any Key to Continue
00190 GOSUB[0,"Press any key to continue
." ]110
00191 RETURN

00199 REM --- Display Menu ---
00200 VAR(X)
00201 READ Z0$: GOSUB[Z0$] 160
00202 FOR U=1 TO X: READ Z0$
00203 CURS 10,U+2: PRINT [13 U] ". ", Z0$
00204 NEXT U
00205 GOSUB[X,"Enter No. of function or
0 to END. " ] 110
00206 RETURN

00979 REM --- Main Menu Items ---
00980 DATA "Main Menu Title"
00981 DATA "Item 1"
00982 DATA "Item 2"
00983 DATA "Item 3"
00984 DATA "Item 4"
00985 DATA "Item 5"
00986 DATA "Item 6"
00987 DATA "Item 7"
00988 DATA "Item 8"
00989 DATA "Item 9"
```


Structuring Your Ideas

Now that you have the starting point for your program, you can concentrate on the structuring of your ideas. Break the program into logical sections for the main menu. For example, enter new data, load data file, save data file, print results and so on.

Could any of these be divided further into sub-menus, such as different printed reports? Consider what variables you will need and set up DIM statements and so on starting at line 10000. Routines are already available for entry of single key-strokes, numbers and strings. Prompts and other messages are also provided for.

You may have some specific messages that you need to use frequently. Set these up in a similar way to the examples provided. Add any other sub-routines you need between lines 210 and 970. Now, all that remains is for you to get down to some serious programming. □

```
00999 REM --- Main Menu Control ---
01000 RESTORE 980:GOSUB191200
01001 ON X GOTO 9000,9000,9000,9000,9000
,9000,9000,9000,9000
01002 GOSUB1"Do you really want to END?"
1120
01003 IF X=0 THEN 1000
01004 CLS:END

08999 REM --- Dummy Menu Item ---
09000 GOSUB1"Option not available."1180
09001 GOTO 1000

09999 REM --- Initialisation ---
10000 REM --- Insert DIM's etc ---
10010 REM

10099 REM --- Title Screen ---
10100 CLS:CURS 340
10110 PRINT"Program Title"
10120 CURS 479:PRINT"by"
10130 CURS 601:PRINT"D.J.Mellefont"
10140 CURS 729:PRINT"v 1.0 1987"
10150 CURS 0:PLAY 0,24

10199 REM --- go to Main Menu ---
10200 GOTO 1000
```

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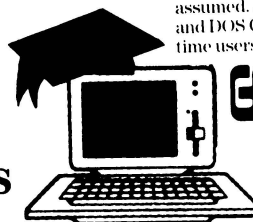
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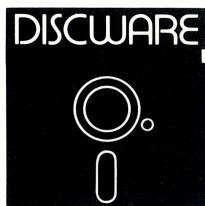
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WELL, ANOTHER month has past and the Telecom issue is still pretty hot around the traps. It would seem that quite a bit of misinformation is being spread. (I should have a response from the June article very soon.)

Papua New Guinea has been added to the PAMS lists, mainly because they are pretty close to us and it might get some of you interested in our northern neighbour. At some stage in the future New Zealand will get into the list, probably towards the end of the year.

A few changes this month, as usual — one in particular is worth a mention: The

Gateway AIBBS has shut down because the sysop had to sell his computer (had a car crash) — sorry to hear about that! But this should serve as a reminder to everyone that Bulletin Boards are generally run on machines that the operator has paid for out of his or her own pocket. I am not aware of one BBS that pays its running costs. Oh alright, some of the user groups are paying for theirs from their membership fees; just remember when you next call a BBS to appreciate the work that the operator puts into the system for just the pleasure (?) of doing it.

Oh yes — if you have an IBM there is a

new version of PKX (a souped up ARC utility) available around the traps, with some really swank features. One feature lets you get a whole mess of files (say some utilities and the related documentation), compress them into a file and then attach a self unpacking shell to it. You end up with something like SOOPU-TIL.EXE which, when run, user unpacks all the files that are included in it! Really neat! It is available on most Fido type systems.

I hope I find you all well, may the force be with you (hopefully not the police force!). □

AED-Prophet Australian PAMS Listing
Changes with Release: 8706 Sun 31 May 1987 11:59:06

AUSTRALIAN CAPITAL TERRITORY

PAMS List INFO: *** AMENDED ***

System: ACT Amiga BBS
Sysop: Mike Hurst-Meyers
FIDOnet: [626/218]
Phone: (062) 59-1137
Baud: V21.V22.V22bis.V23.B103.B212
Access: Reg.LVA
Computer: IBM Clone
DOS: PCDOS 3.1
BBSSoftware: Opus

PAMS List INFO: *** NEW System ***

System: Canberra KBBS
Phone: (062) 88-0412
Baud: V21

PAMS List INFO: *** AMENDED ***

System: PCUG Bulletin Board
Sysop: Alan Salmon
FIDOnet: [626/229]
Phone: (062) 59-1244
Baud: V21.V22.V22bis.V23
Access: Mem.LVA
Computer: IBM PC-AT
DOS: PCDOS 3.1
BBSSoftware: Opus
Info: Access free to members of PCUG
: \$15pa incl monthly newsletter

PAMS List INFO: *** AMENDED ***

System: Pharmacy BBS
Sysop: Michael Pye
FIDOnet: [626/223]
Phone: (062) 92-3875
Baud: V21.V22.B103.B212
Access: Reg.Public
Hours: 0600 - 2130
Computer: Kaypro 16
DOS: MSDOS
BBSSoftware: Opus

PAMS List INFO: *** Status Changed ***

System Status: *** OFFLINE ***
System: The Gateway AIBBS

NEW SOUTH WALES

PAMS List INFO: *** AMENDED ***

System: Amstrad ABBS
Sysop: Riccay Schmahl
Phone: (02) 981-2966
Baud: V21.V22.V22bis.V23
Access: Reg
Computer: Amstrad PC1512
DOS: MSDOS 3.2
BBSSoftware: Opus

PAMS List INFO: *** AMENDED ***

System: Bee-Hive BBS
Sysop: Paul Pinches
Phone: (02) 520-5181
Baud: V21.V22
Access: Mem.Reg
Computer: Microbee
OS: CP/M80
BBSSoftware: ROS 4.0

PAMS List INFO: *** AMENDED ***

System: Club Amiga BBS
Sysop: Ross Kellaway
Phone: (02) 521-6338
Baud: V21.V22.B103.B212
Access: Mem.LVA
Computer: Amiga 1000
BBSSoftware: BBS-PC

PAMS List INFO: *** Status Changed ***

System Status: *** OFFLINE ***
System: Comm-Link BBS

PAMS List INFO: *** Status Changed ***

System Status: *** OFFLINE ***
System: Datacom KBBS

PAMS List INFO: *** AMENDED ***

System: Dymock's Computer Bookline
Sysop: Bob Richards
Phone: (02) 232-3061
Baud: V21.V22.V23
Access: Reg.VA
Hours: Weekdays: 1000 - 0830
: Weekends: 24 Hours

Computer: IBM XT
DOS: PC-DOS
BBS Software: Fido

PAMS List INFO: *** NEW System ***
System: First Nice MIDILine
Sysop: Andrew Khoo
FIDOnet: [620/801]
Phone: (02) 868-4347
Baud: V22.V22bis

PAMS List INFO: *** AMENDED ***
System: Illawarra C-64 BBS
Sysop: John Simon
Phone: (042) 61-8230
Access: Reg.VA

PAMS List INFO: *** NEW System ***
System: MicroLink BBS
Sysop: Tony Callahan
Phone: (02) 477-7509

PAMS List INFO: *** AMENDED ***
System: Newcastle Micro Club RCPM
Sysop: Tony Nicholson
Phone: (049) 68-5385
Baud: V21.V22.V23
Access: Mem.VA
Hours: Weekdays: 1700 - 0830
: Weekends: 24 Hours

PAMS List INFO: *** AMENDED ***
System: Playground BeeBS
Sysop: Brett Selwood
Phone: (02) 53-9688
Baud: V21.V22.V23
Access: Mem.Reg.LVA

PAMS List INFO: *** AMENDED ***
System: SMUG Bee RCP/M
Sysop: Bob Fryer
Phone: (02) 607-7584
Baud: V21.V22.V23
Access: Reg.VA
Computer: MicroBee

PAMS List INFO: *** NEW System ***
System: The Galactic Federation
Sysop: Kevin Gladwin
Phone: (02) 233-5040
Baud: V21.V22.V22bis.V23
Hours: Weekdays: 1700 - 0900
: Weekends: 24 Hours
Computer: IBM Compat

PAMS List INFO: *** NEW System ***
System: Zenith BBS
Sysop: Tony Callahan
Phone: (02) 477-7509
Baud: V21
Access: Public

PAMS List INFO: *** AMENDED ***
System: Zeta RTRS
Sysop: Nick Andrew
FIDOnet: [712/602]
Phone: (02) 627-4177
Baud: V21.V22.V22bis.V23.B103.B212
Access: Mem.VA

VICTORIA

PAMS List INFO: *** NEW System ***
System: AmigaLink
Sysop: Bohdan Ferens
Phone: (03) 792-3918
Baud: V21.V22.V23

PAMS List INFO: *** AMENDED ***
System: Bayside
Sysop: Paddy Plebanowicz
FIDOnet: [630/313]
Phone: (052) 51-4110
Baud: V21.V22.V23
Access: Reg.Public
Computer: IBM Clone
BBS Software: Opus

PAMS List INFO: *** AMENDED ***
System: Eastcomm BBS
Sysop: Maurice Halkier
FIDOnet: [630/312]
Phone: (03) 288-0775
Baud: V21.V22.V23.V23ORG
Access: Reg.VA
Computer: PC-AT Clone
DOS: PCDOS 3.1
BBS Software: Opus

PAMS List INFO: *** AMENDED ***
System: MBUG Australia Inc
Sysop: Mike Thompson
Phone: (03) 882-1571
Baud: V21.V23
Access: Mem

PAMS List INFO: *** Status Changed ***
System Status: *** OFFLINE ***
System: PC-Domain BBS

PAMS List INFO: *** NEW System ***
System: The Deepseas BBS
Sysop: John Drinwater
FIDOnet: [630/308]
Phone: (03) 762-9204
Baud: V21.V22.V23
Access: Public
Hours: 2300 - 0600
Computer: PC-XT Clone
BBS Software: Opus

PAMS List INFO: *** AMENDED ***
System: The Info-Source BBS
Sysop: Clement Maloney
Phone: (03) 397-1165
Baud: V21.V22.V22bis.V23.B103.B212
Access: Mem.VA

PAMS List INFO: *** Status Changed ***
System Status: *** OFFLINE ***
System: The Magic Pudding BBS

QUEENSLAND

PAMS List INFO: *** AMENDED ***
System: Brisbane Commodore User Group
Sysop: Colin Canfield
Phone: (07) 395-6725
Baud: V21.V22.V23
Access: Mem.VA

PAMS List INFO: * AMENDED *****

System: Brisbane Experimental RCPM
Sysop: Rick Dalley
Phone: (07) 395-1809
Access: Mem.VA
Info: User Works Node # 4

PAMS List INFO: * AMENDED *****

System: Brisbane MicroBee User Group
Sysop: Graham Scott
Phone: (07) 38-4833
Access: Mem.VA
Info: User Works Node #2

PAMS List INFO: * NEW System *****

System: COM ONE
Phone: (057) 62-5150
Baud: V21
Access: Public

PAMS List INFO: * AMENDED *****

System: Educational RCPM
Sysop: Andrew Waddell
Phone: (07) 266-3369
Baud: V21.V22.V22bis.V23
Access: Mem
Info: User Works Node # 1

PAMS List INFO: * AMENDED *****

System: Electric Dreams BBS
Sysop: Joe Altoff
Phone: (07) 399-1322
Baud: V21.V23
Access: Mem.VA
Info: User Works Node # 5

PAMS List INFO: * AMENDED *****

System: SVI-RBBS
Sysop: Brendan Pratt
Phone: (075) 46-3252
Baud: V21
Access: Mem.Reg
Computer: Spectravideo
DOS: CP/M80
BBSSoftware: TurboBBS
Info: User works node 7

PAMS List INFO: * AMENDED *****

System: The Focus BBS
Sysop: Geoff Ryan
Phone: (07) 285-5814
Baud: V21.V23
Access: Mem.VA
Info: User Works Node 6

SOUTH AUSTRALIA

PAMS List INFO: * NEW System *****

System: Cadzow Fido
Sysop: Scott Cadzow
Phone: (08) 79-3091
Baud: V21.V23
Access: Public

WESTERN AUSTRALIA

PAMS List INFO: * NEW System *****

System: Apple BBS
Sysop: Don Pugh
Phone: (09) 381-6061

Baud: V21
Access: Public
Computer: Apple II+
DOS: DOS 3.3

TASMANIA

PAMS List INFO: * NEW System *****

System: Hobart Users BBS
Sysop: Denise Webber
Phone: (002) 49-4405
Baud: V21
Access: Mem.LVA
Hours: Weekdays: 1500 - 0700
: Weekends: 24 Hours

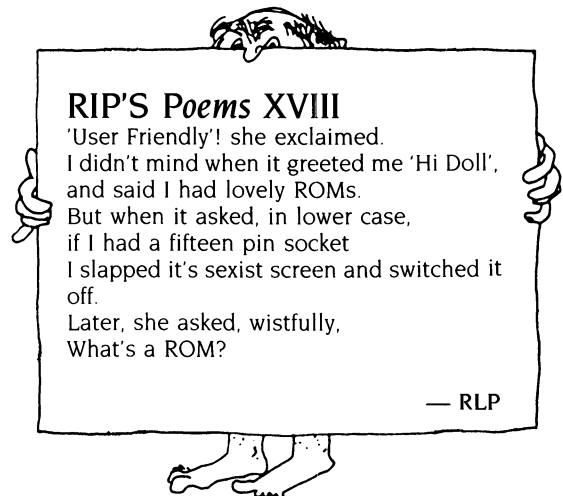
PAMS List INFO: * AMENDED *****

System: Tassie Bread Board System
Sysop: Ian Campbell
Phone: (003) 26-4248
Baud: V21.V22.V22bis.V23
Access: Mem.LVA
Computer: Kaypro PC
DOS: MSDOS 3.2
BBSSoftware: TBBS

PAPUA NEW GUINEA

PAMS List INFO: * NEW System *****

System: PNG One
Sysop: Daltron
FIDOnet: [710/11]
Phone: (675) 25-6784
Baud: V21.V22.V22bis.V23.B103.B212



Bugs in the Drives

ONE OF THE FACTS of life about computers is that it is virtually impossible to guarantee that anything will be 100 per cent bug free.

The 1541 and 1571 disk drives are smart peripherals that have their own processors and internal memory. They are computers in their own right, have RAM chips which provide internal workspace, ROM chips which carry their program code, and like any computer, there is always the potential for bugs. Fortunately, the drives have proven to be surprisingly reliable.

It's not often that you have cause to worry about exactly what is going on inside — you just issue the orders and let the systems code carry them out. The comparison can be made with using the brakes on a car; it's vital that you know how to give the orders (putting your foot on the pedal), but you don't need to think about how the order passed on to the wheels unless something is wrong (the brakes aren't working).

But people have long suspected that the 1541 has a problem with its SAVE@ (Save and Replace) command. The bug has been a difficult one to diagnose and track down. Many theories and solutions have been mooted as to why files are occasionally corrupted, and most of them pointed to careless user practice (like not properly closing files).

Carelessness can cause you to lose files, but there was indeed a bug in the 1541 ROM all along (and still is). It's not one that shows up very often, but when it does it can be a real @*?!

The hacker who finally nailed the bug was Phillip Slaymaker in Florida, and the explanation goes something like this — The 1541 has five internal buffers. Normally DOS assigns the buffers to different channels as they are needed. A normal Read or Write operation would typically tie up three of the five buffers, one each being assigned to the BAM (Block Availability Map), the directory sector, and the file sector being read/written.

The SAVE@ command, however, requires all five buffers; two read, two write and one for BAM. If for some reason DOS cannot find five free buffers it will try to steal one that has been assigned, but that seems to be presently unused. If the buffer stolen happens to be the one for the BAM then the Save and Replace may fail, but not always.

It doesn't always fail because when the 1541 first reads the BAM it keeps some of it in memory. This memory holds the BAM information for two complete tracks. When the DOS wants to know if a track has any blocks free, it checks this memory. If there are no free blocks it writes the memory back onto the disk's BAM and reads in the BAM for another track.

The problem is that there is space for only two tracks in memory and if the SAVE@ has, in the meantime, altered more than two tracks then the newly written BAM will be inaccurate.

Sometimes the inaccuracy will prove to be harmless, sometimes it can be fatal to several files. As you can see, there is a lot of 'iffyness' about the conditions that can lead to the bug occurring and this is why it has been so infuriatingly difficult to track down the exact cause.

Why should there ever be a shortage of available buffers? After all, the drive has got five and few people are silly enough to have other channels open to the drive when they are saving a file. It turns out that there is another bug that does tie up one of the buffers.

Apparently, if you issue a command to the drive that doesn't specify the drive number, the 1541 will default to drive one. Now the 1541 is a single drive unit and so drive one does not exist. This means that the drive will detect an error condition and then try for drive zero. The error condition is an internal one appearing on the buffer assigned to drive one. It's quite invisible to the user. (Confused yet?)

The catch comes when DOS tries to attempt a SAVE@. The routine that allocates buffers cannot access buffers with an error condition, so you are stuck with four buffers attempting to do the work of five.

Carelessness can cause you to lose files, but there was indeed a bug in the 1541 ROM all along (and still is). It's not one that shows up very often, but when it does it can be a real @?! |*

The Moral

The moral of the story is to always specify drive number zero when doing a SAVE@ (SAVE'@0:filename',8) and always ensure that all other channels are closed. If you want to be 100 per cent sure, the safest way of all is to avoid using the command; scratch the old file first and THEN save the new one.

The origin of this bug probably go back to the days of the CBM 4040 dual drive. Some folk have suggested that a form of the bug was present even then but it now seems obvious that when Commodore designed the 1541 they used much of the same DOS routines and made minor modifications for the serial bus. How else do we explain a single drive unit defaulting to a non-existent second drive?

Sadly, the 1571 drive has its share of problems as well. I haven't seen a detailed explanation of the cause of the bug, but the symptoms appear to show up when using the second side of the diskette.

Again the problem is related to the BAM getting confused to the point where used blocks appear free and vice versa. Many folk think it's just another version of the save and replace bug, but others claim it affects only sequential and relative files, not program files.

I've not encountered any of these problems myself (touch wood), but that may be because I rarely scratch files to re-use the space. I like to keep successive drafts for later reference.

Commodore have acknowledged that they do have a problem, and that they are developing a new ROM for the 1571, but at the time of writing there is still no sign of it. The new ROM will be made available to anyone who wants it, but it won't be a free refit. □

*Contributions of programs,
hints and interesting news
are always welcome, as
are constructive criticisms
— write to me care of
Your Computer so that we
can tune this column to
the needs of Atari users.*

WELCOME TO THE FIRST Your Atari column! As I sit at my keyboard waiting for enlightenment and inspiration, I ask myself 'How did I come to to write a magazine column on the Atari?'

Well, it all came about when I decided to submit a short article on useful routines for the Atari ST. These had been gleaned from public domain programs, and performed useful tasks such as reading the position of the mouse, creating alert boxes and so on — they're given below. In my covering letter, I suggested we should have a monthly column for the Atari; one thing led to another... and here we are!

Let's start with a general look at the machines I'll be talking about — this is for those who aren't lucky enough to have an Atari — the rest of you can go on to the interesting bits below.

The Atari 520-ST was launched as Jack Tramiel's answer to the Macintosh — it was originally dubbed 'the Jackintosh.' At the time, the 520-ST (and its big brother the 1040-ST) offered incredible power at an amazingly low price, at least in the United States.

In this country, the machine has been slow to take off, but nevertheless represented very good value compared to the Mac, Amiga and the Apple IIGS. With a whole range of price fluctuations over the past few months, and the launch of a cut-down Amiga, the price advantage is no longer so clear cut.

The 520-ST comes as a combined keyboard/system unit with an external disk drive. This type of packaging places it among the home computers in style, in company with the Commodore 64 and machines of that ilk. However, the styling, quality of manufacture and performance of the Atari place it in a class above the other 8-bit machines.

The 1040-ST has an integral disk drive set into the right-hand end of the main casing, where you need to bend your neck to get a view of the slot. It also has a built-in power supply replacing the monstrous black bricks attached to the 520 and its disk drive.

The keyboard has a good feel, though not quite up to IBM standards. I find the tops of the keys are a little too close together, resulting in two keys sometimes being pressed simultaneously. There are two separate cursor and numeric key pads, and a row of ten function keys. These are a strange rounded diamond shape, and although they look very smart a more conventional shape and bolder markings would be more practical.

Main memory is either half a megabyte or a full meg, depending on the model. (Two and four megabyte models are coming 'real soon now'). The processor is a Motorola 68000, running at 8 MHz.

The back of the system unit holds a range of ports including an RS232 serial port, Centronics printer port, MIDI in and out, and floppy and hard disk sockets. At one end of the casing are two joystick/mouse ports, while the other has an edge connector which will accept 128 kbyte ROM cartridges. The monitor outlet

connects to either RGB color or high resolution monochrome monitors. There is also an RF modulator to connect your TV. (I guess you could say the ST is 'well-connected').

One of the big attractions of the ST is the range of software bundled with the machine. This seems to vary a little between dealers — mine came with Basic, Logo, the Neochrome painting program, an excellent word processor, a database plus the operating system.

Tramiel Operating System?

The Atari operating system is a hybrid of Digital Research's GEM (Graphics Environment Manager) overlaying a program called TOS (Tramiel Operating System?). Early versions of the ST had the whole system on disc, which apparently used up over half the available memory just for the operating system. The current model has TOS in ROM. GEM is the now familiar desk top environment pioneered by Xerox and later taken up by Apple with their Lisa and Macintosh computers.

The system is fully icon and mouse driven. Unless you get hold of a DOS shell there is no such thing as a command line. This is, as they say, both good news and bad news. The good news is that a five year old can easily load and run programs, copy files between discs and so on. (I'm not kidding — my five year old does these things all the time!) The bad news is that batch file operation, concatenation of files and other slightly more 'advanced' operations are not readily available from the desk top.

Although I was sceptical when I first read about the WIMPs interface of the Lisa all those years ago, I've found that the use of the mouse is a habit very readily acquired. I frequently find myself reaching for the little rodent when using Wordstar on my office IBM. Apart from its use as an operating system necessity, the mouse makes word processing almost a pleasure and also makes possible the paint type programs.

The Atari is supplied with a freebie painter called Neochrome, which is probably the best give away program you will ever see. It operates in the 320 x 200 pixel low resolution mode, with 16 colours on screen from a palette of 512. Apart from the usual drawing tools Neochrome (V1.0 and later) allows you to use the knife to cut a piece out of an object and use that piece as a brush. By rotating the palette,

animation of parts of the picture can be simulated. The use of a brush cut from an animated object can create incredible results. If your ST came with Neochrome V0.5, see your dealer about an upgrade.

In future columns I will look at some of the features of this machine in more detail, together with some of the software and hardware add-ons now available.

A little about the philosophy behind this column — Unless you want to spend hundreds of dollars on the wide range of books about the ST, the major source of useful information on the Atari comes from some excellent (but terribly overpriced) American and English magazines.

Your Computer now seems to be the only computer magazine with a fully Australian content. The machine-specific pages at the back of *YC* are one of the few outlets left for users of 'non-standard' machines in this country.

As with most of these pages, this one will depend for its prosperity on feedback from *you*. Contributions of programs, hints and interesting news are always welcome, as are constructive criticisms — write to me care of *Your Computer* so that we can tune this column to the needs of Atari users.

And now . . .

Subroutine Library for the Atari ST

There are still a few versions of Basic around which rely on peeks, pokes and obscure system calls to accomplish some very commonplace functions. The Basic supplied with the Commodore 64 is a classic example.

Now the Atari ST is a machine of immense power, but still requires peeks, pokes and system calls to use many of the features which make the machine so powerful. For instance, there is no keywork in ST Basic to read the mouse.

By setting up a library of useful routines, much of the drudgery of this type of programming can be avoided. Simply load the library into memory before coding up the program, use the subroutines which are relevant, then delete the rest.

The routines described in this article have been gleaned from public domain programs. In most cases, they utilise the Atari's Virtual Device Interface (VDI) to perform the required function. To use the VDI, it's necessary to poke certain parame-

ters into reserved memory locations, then issue the call `VDISYS(0)`.

The memory blocks are referenced by the variables `CONTRL`, `INTIN`, `INTOUT`, `PTSIN` and `PTSOUT`. Before calling the VDI it is necessary to pass the required parameters by peeking or poking these locations and offset addresses. Some of the commonly used parameters are set out in Table 1.

Now, turning to each of the routines in Listing 1, I'll show how to make each of them do something worthwhile (or, at least interesting) —

SETTITLE

`SETTITLE` simply places the name of your program in the title line of the output window (in place of the word 'output'). To use this function, just create a text string called `TITLE$`, then call the subroutine.

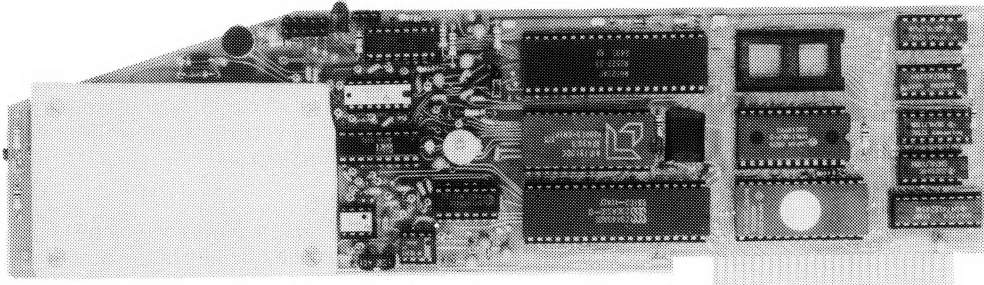
```
50000 SETTITLE: a# = gb: gintin = peek(a#+8)
50010 poke gintin,peek(systab+8):poke gintin+2,2
50020 s#=gintin+4: title$=title$+ chr$(0)
50030 poke s#,varptr(title$): gemsys(105)
50040 return
50050 '
50060 ' *****
50070 '
50080 READMOUSE: poke contrl,124
50090 poke contrl+2, 0: poke contrl+6,0
50100 vdisys(0)
50110 mx = peek(ptsout): my = peek(ptsout+2)
50120 if peek(intout) = 0 then READMOUSE
50130 return
50140 '
50150 ' *****
50160 '
50170 VDIIDRAW: 'Draws and fills rectangles
50180 ' insert color line here if needed
50190 poke contrl,11: ' VDI opcode
50200 poke contrl+2,2: ' Number of vertices
50210 poke contrl+6,0: ' Number of attributes
50220 poke contrl+10,1: ' Draw bar or rectangle
50230 poke ptsin,x1: ' top left x co-ord
50240 poke ptsin+2,y1: ' top left y co-ord
50250 poke ptsin+4,x2: ' bottom right x co-ord
50260 poke ptsin+6,y2: ' bottom right y co-ord
50270 vdisys(1)
50280 return
50290 '
50300 ' *****
50310 '
50320 ALERTBOX: a# = GB: gintin = peek(a#+8): gintout = peek(a#+12)
50330 addrin# = peek(a#+16): poke gintin,0
50340 text$ = text$ + chr$(0) + chr$(0)
50350 poke addrin#, varptr(text$)
50360 gemsys(52): button = peek(gintout)
50370 return
50380 '
50390 ' *****
50400 '
50410 HIDEMOUSE: poke contrl,123: poke contrl+2, 0: poke contrl+6,0
50420 vdisys(0)
50430 CLS: poke contrl,3: poke contrl+2,0
50440 poke contrl+6,0: vdisys(0)
50450 return
50460 '
50470 ' *****
50480 '
50490 SHOWMOUSE: poke contrl,122: poke contrl+2,0
50500 poke contrl+6,1: poke intin,0
50510 vdisys(0)
50520 '

```

Listing 1. There are an immense number of functions and routines available from the VDI and GEMSYS — hundreds, in fact. The routines presented here are some of the more useful, and could form the basis of an extensive programmer's subroutine library for the Atari ST.

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Sending/receiving files is very simple:—

- Press "ESC" to display menu.
- Select "(S) END A FILE" option
- Answer the prompt "FILENAME?:"

The modem will search the disk for the file, make all the decisions (e.g. binary, basic, textfile, DOS 3.3 or ProDos) and transmit it in the correct format. <CR> transmits the file in memory. Similarly to receive a file select "(R) RECEIVE A FILE" option.

* AUTO ANSWER — AUTO DIAL. Senses true dial tone, ring tone, busy tone and acts intelligently, returning status messages. Characters can be included in the phone number to set baudrate, pause, "await dialtone" and multiple redial on busy. On answer, it selects the incoming baudrate by precision frequency measurement. This is much more reliable than the normal autosearch using carrier detect which is often confused by voice and phone tones. A reliable autosearch is a must for bulletin board operation.

* 300 Baud full duplex or 1200/75 and 75/1200 with fast automatic line turnaround. An upgrade kit to add V22 (1200/1200 baud) and V22 Bis (2400/2400 baud) will be available later.

* Main menu option "(V)IDEOTEXT" shows the VIATEL menu. It becomes a full graphics VIATEL terminal, automatically dialling and transmitting the user ID stored in the battery backed ram. When online, a keypress will immediately save pictures to memory. These can be reviewed later and selectively saved to disk or printed (requires a graphics printer card). Pictures can be loaded from disk and printed out. The modem can act as a videotext host and can be programmed to act on frame information. e.g. — use the clock to ring "MONEYWATCH" hurly and dial you at the office if your shares move outside a given range.

* TELESOFTWARE DOWNLOAD facility to purchase programs over VIATEL from suppliers such as MICROTEx 666 and TANGO.

* A full wordprocessor in EPROM for pre-composition of text before transmission. It can also be used to edit or print received files as well as for general wordprocessing.

* Onboard battery backed calendar clock can time and initiate calls or keep an activity log. ProDos uses it to time and date disk files and it is accessible from Basic.

* 2Kx8 battery powered CMOS RAM stores default parameters, phone numbers, ID, password, logon strings, search codes and setup parameters (e.g. baud rate, parity, printer ON) for each number, allowing single keystroke call establishment to specific areas of complex databases. Main menu option "(T)ELELIST" displays the list of 23 names and one is selected.

* Incorporates XON/XOFF and CHRISTENSEN error correcting protocol. Textfiles are not so fussy but error correction is a must when transferring program files. A debug function can display normally invisible control characters sent by the host.

* Can output directly to printer even when online at 1200 Baud — a fast printer is not required as the printer is spooled out of the receive buffer. A "FILTER" function is available to remove screen control characters from textfiles (these can drive a printer crazy). Special scroll routines print to 80 column screen and printer at 1200 Baud without any lost characters.

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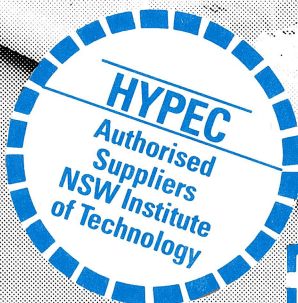


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READMOUSE

READMOUSE returns the *x* and *y* co-ordinates of the mouse position, at the moment the mouse button is pressed. The routine will not return until one of the mouse buttons is pressed. The co-ordinates are returned as the variables *mx* and *my* respectively. To call up this routine, simply type it in.

VDIDRAW

VDIDRAW is worthy of an article of its own. For the moment, we will restrict ourselves to drawing a filled rectangle. This routine is much quicker to use than a series of LINEF commands followed by a FILL, once the initial subroutine is in place. It also executes very quickly, giving an almost instantaneous appearance of the rectangle on the screen.

Before calling VDISYS, we must tell the computer what type of shape we are going to draw, the minimum number of vertices (corners) needed to define the shape, the colours and any attributes.

Assuming that we want a rectangle drawn in green with a brickwork hatching, and the top left hand corner at location 50,50 and the bottom right hand corner at 100,100, then the following program will suffice...

```
10 fullw 2: clearw 2
20 color 1,3,3,12,2
30 x1 = 50: y1 = 50
40 x2 = 100: y2 = 100
50 gosub VDIDRAW
```

ALERTBOX

ALERTBOX is the routine which produces the message windows so characteristic of the GEM user interface. (You know the sort of thing — 'Disk in Drive A is write protected...') The routine lets you select the stop sign or question mark symbol, one or more lines of text and one or more 'buttons' to select.

Before calling ALERTBOX, you must create a string variable called text\$, which contains all the information needed to produce the message in the box. For example —

```
text = "[3] [Are you happy ?] [YES][NO]"
```

Note that the three components (the stop sign number, message, and button labels) are contained within square brackets within the string. The vertical bar (|) between YES and NO separates these into

two separate button boxes. A vertical bar can also be used to break the message up into lines of text. The text\$ variable can include text from other variables, such as the name of a player in a game.

The stop sign numbers are —

- 0 = Nil,
- 1 = Exclamation mark,
- 2 = Question mark, and
- 3 = Stop sign.

The buttons are numbered from left to right, with a button number equal to 0 indicating that the mouse button has not been pressed, or has not been clicked on a button within the alert box.

For example —

```
10 input "What's your name "; name$
20 text$ = "[2] [How many tries do you want, " + name$
30 text$ = text$ + "]" [1;2;3]"
40 gosub ALERTBOX
50 print button
```

HIDE- and SHOWMOUSE

HIDEMOUSE and SHOWMOUSE can be used to hide the image of the mouse pointer so that it does not spoil the appearance of the graphics screen. SHOWMOUSE reveals the pointer.

Note that the mouse can still be used, it's just that you won't be able to see what you are doing with it! A simple gosub statement is all that's required to hide or reveal the pointer.

CLS

CLS is a routine which completely blanks the screen, including all the window

The use of a brush cut from an animated object can create incredible results. If your ST came with Neochrome V0.5, see your dealer about an upgrade.

frames. This is useful if you want to import a picture screen from Neochrome or Degas. Again, all that's required is to gosub to CLS.

And more...

Now, that should give a good start to a library of useful routines. Send in any you've created (or found), and we'll publish the best ones in a future column. And let us know about any good software you've found for the Atari, so we can tell everyone about it! □

Table 1. To use the Atari's Virtual Device Interface (VDI), it's necessary to poke certain parameters into reserved memory locations, then issue the call VDISYS(0) — these are some of the commonly used parameters.

ADDRESS	PURPOSE
CONTRL	VDI op-code
CONTRL+2	Number of vertices (for drawing)
CONTRL+6	Number of attributes to be passed
CONTRL+10	Primitive drawing identifier
PTSIN (and offsets)	Co-ordinates for drawing routines
PTSOUT	X co-ordinate of mouse
PTSOUT+2	Y co-ordinate of mouse
INTOUT	Alert box button selected

There are a host of ways of getting data from one [drive or disk] to another, and over the next few months I will share the details of some methods which have worked for me.

Transferring from MS-DOS to PS/2
WITH THE ADVENT of the IBM Personal System/2 microcomputers comes a problem for all users who have to use the new machine with 90 mm drives and either have a lot of software and data on 135 mm disks or still have older PCs with 135 mm drives. There are a host of ways of getting data from one size to another, and over the next few months I will share the details of some methods which have worked for me.

The cheapest way is simple serial transfer. First, connect the machines together via their serial ports with a serial cable containing a null modem adapter. Then, run some communications software on each to read a file, send it to the other machine and then write it to disk.

No More Jargon

Now, step by step, let's unravel that jargon. If you have to use a modem with your computer to connect it via a telephone line to another computer, then each computer will be connected to a modem by a straight 25-core cable with a 25-pin plug (male or female) at each end.

Each pin is numbered (from 1 to 25), and in the simple case of computer to modem connection, pin 1 of the connector at one end of the cable is connected to pin 1 of the connector at the other end. Pin 2 connects to pin 2, and so it continues pin by pin through to pin 25 connecting to pin 25.

This simple cable, connecting two computers in the same room together, won't work because both computers will be trying to send and receive information on the same pins.

To work, we need a cable which crosses over the connections between the pins at one end, which are trying to send, and the pins at the other end, which are trying to receive. Because this cable takes the place of a telephone line with a modem at each end, it is called a null modem adapter or null modem cable.

Making a Null Modem

Null modem adapters are readily available from most electronics or computer stores, and making one is not difficult. The one I use most often was made by NEC for connecting their PC8201 laptops to other machines, and has the part number PC-8295A-02. It always works for me, even when connecting laptops to CP/M, laptops to IBM PCs, PCs to Toshiba's and many other combinations.

It has the advantage that it uses a multicore cable, about 5 mm in diameter, which is flexible and convenient, instead of a ribbon cable. The disadvantages are that the shells on the connectors are rather large, and may not fit some machines, and it uses male connectors at each end.

How it's connected is shown in Figure 1.

With IBM computers, the connection between 17 in each plug and 24 in the other is not required as there is no connection to either of those in the IBM serial port. On some other machines, these pins may be used for timing signals, but not connecting them won't have any bad effect when connecting two IBM's or clones together.

Male or Female

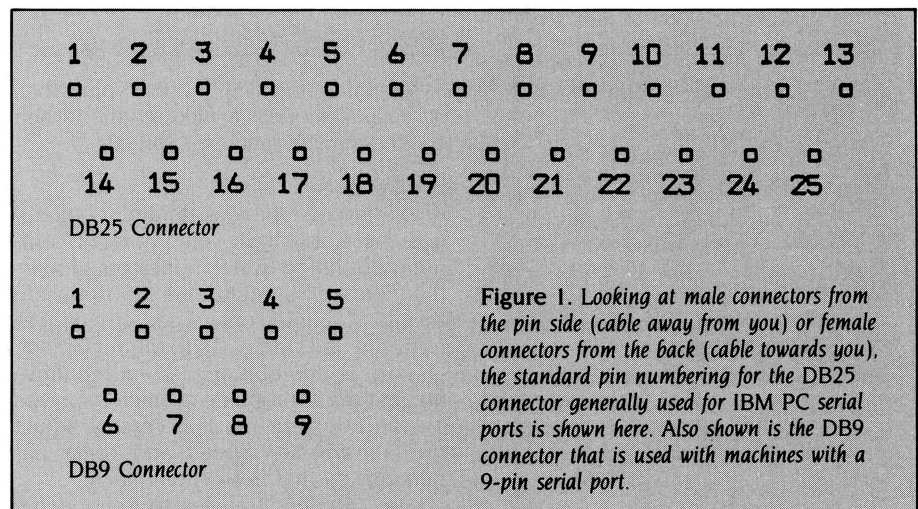
The serial ports on most machines are female, and require a cable with male connectors at each end. IBM's, however, use male ports on the machine and the cable to connect to them must have female connectors. I hate reaching around the back of machines and so I made up two extension cables with a female 25-pin connector at each end.

Modem7 for the IBM is available on the YC Bulletin Board as MDM7.ARC.

One end is permanently plugged into the IBM's serial port, and the other routed around the machine to a spot next to the keyboard. Now a null modem cable with a male connector at each end can be used to connect any IBM to any IBM, or to connect any other pair of machines whose serial ports have female fittings.

I made up two short, straight cables with each of the 25 pins connected to the pin of the same number at the other end and with a female connector at each end. This is most easily done with ribbon cable and insulation displacement connectors.

Get a suitable length of 25-core ribbon cable, around 600 mm long for each fe-



male to female cable. (If the only cable available has more than 25 cores, the extras can easily be stripped away.)

Cut the ends of the ribbon straight across at 90 degrees to the side of the ribbon with sharp scissors. Slip the cable into the opening of the IDC so that it pokes out about 3 to 5 mm. Making sure that at each end, the core with the coloured stripe lines up with pin 1, squeeze the connector closed with a woodworking vice. Prongs in the connector cut through the cable insulation and make contact with the cores.

Some IDC connectors have a clip to take the force when the cable is tugged. If your IDCs have clips, fit them. A sharp razor blade is advisable to cut off the few millimetres of cable protruding, check that no stray strands are shorting between cores and the job is done.

Building a Null Modem Cable

If you have the female to female cables mentioned above, your null modem must have a male connector at each end, so get two 25-pin DB25 male connectors and back shells. Otherwise, if you are certain that you will only ever need to connect one IBM to another and will never need to connect to any other computer, get two female connectors suitable for soldering and complete with shells.

The next step is to get some 10-conductor cable (ribbon cable is fine) and solder it to the connectors to each end of the cable. Pin 1 at the first end connects to pin 1 at the second. Pin 7 likewise connects to pin 7 and connect the other pins so –

1	—	1
2	—	3
3	—	2
4	—	5
5	—	4
6	—	20
20	—	6
7	—	7
17	—	24
24	—	17

Next month, some other ways of transferring files from 135 to 90 mm disks and of using 90 mm disks with older PCs.

Now just plug it in and fire up the software. If you made the recommended male to male cable don't plug it into that female connector on the back of your PC, that's the parallel port and will do your machine no good at all. Use those female to female cables.

AT Adapter

If you have a machine with a 9-pin serial port, like the AT and Toshiba laptops then a straight 9 pin to 25 pin adapter will be required to connect the null modem to the 9-pin port. The pin connections are —

9 pin	25 pin
1	8
2	3
3	2
4	20
5	7
6	6
7	4
8	5
9	22

This is a straight 9 pin to 25 pin cable, and a null modem is also required when connecting two machines directly.

Software

If you have used a modem and a bulletin board you will have some form of communications software; Supercom, Crosstalk, Mirror, PC-TALK, and Procomm are the most common ones. Load up a copy at each end and start it. Go to terminal mode and press a few keys at each end, confirming that the appropriate character appears on the other screen. If necessary adjust the transmission speed and other parameters so that both ends match.

Use XModem transfer to send a file from one machine to the other, which

makes sure that all the file arrives without error. Some packages allow the use of wildcards in the name of the file to be sent, and allows unattended transfer of all files in a directory.

The one I use for machine to machine transfer of a batch of files is the venerable Modem7, a public domain program famous for its tiny size and terse user interface. It does, however, have a reliable batch mode, and versions are available for almost any machine ever made. Modem7 for the IBM is available on the YC Bulletin Board as MDM7.ARC. Download it and extract MDM71.COM.

To send files at high speed in batches from one machine to another, start Modem7 at each end. At the sending end enter the command —

SB.9600 filespec

and at the receiving end enter the command —

RBO.9600

Now Modem7 will send all files which match 'filespec' from one machine to the other. They will have the same names in the target machine that they had in the source machine.

The files are sent in blocks. After each block has been sent both ends calculate a checksum based on the characters sent. The sending end sends that checksum after each block; and the receiving machine compares it with the checksum calculated at its end. If the checksums match, the receiving machine calls for another block to be sent. If they don't match, the receiving machine rejects the block and calls for it to be sent again.

The meaning of the commands above? SB.9600 says to send in batch mode at 9600 bits per second. RBO.9600 says to receive in quiet batch mode at 9600 bits per second.

Modem7 normally updates the screen at both end after each block is sent, giving the block number. This is OK at the sending end at any speed, but errors occur over 4800 bits per second if the receiving end also has to update the screen. Quiet batch mode does not update the receiving end screen and again is OK at 9600. The 'filespec' can include the standard DOS wildcards, and *.* will send all files in the default directory.

Next month, some other ways of transferring files from 135 to 90 mm disks and of using 90 mm disks with older PCs. □

Two Joysticks on a Microbee

MANY THANKS TO Keith Westley of Girra-ween. He was the first individual to respond to my plea for ideas and hints for the Microbee. He sent me an easy to build method of using two joysticks at once on the Microbee — see the separate box with the circuit diagram on this page. He hopes that people write programs to use its potential.

Putting on a Third Disk Drive

I recently added a third disk drive to my Microbee. It had dual 5¼ inch drives — and now sitting quietly on top of my drive box there is a little 3½ inch disk drive.

These disks hold nearly 800K — so, at one stroke, I have doubled my online disk capacity. I intend to use this extra drive to store permanent back-up copies of all my writing.

It also enables me to swap files with friends who have 3½ inch drives. Those who are moving into using computers for the first time are usually buying the 3½ inch drives — I will now be able to help them along.

The cost involved was \$200 for the NEC drive from MBUG — the Melbourne User Group. (Phone Kevin Carr, the Treasurer on (03) 233 4629. If you can't get him, try the President, Andrew Barfoot, on (03) 758 4822.)

It is a very quiet and well engineered drive (of the same quality as most NEC products). You can connect it to the power supply within your disk drive box. Picking the correct connections demands a bit of expertise. (I had to find someone to help here.)

Wire from these connections through the grid at the back to a plug sitting loose on top of your disk drives. Plug this into the back of the new disk drive. (Don't solder this onto your new drive unless you are 100 per cent sure of your work. There is no need to do this and it adds an unnecessary risk — and probably voids any guarantee.)

MBUG also provide a cable which plugs onto the end of your existing wide disk drive cable and goes both to your previous drives and to the new drive. No alterations are needed — and you can remove your new drive at any time. This cable is \$25 extra. Postage and packing would be extra too.

I suspected a poorly transferred file. So I went back and collected another copy of my Mitac disk and Bee Aliened it across again. All now worked perfectly. It could still be a bug in my computer tonight — but I suspect Bee Alien.

I have my new drive just sitting on top of my disk drive box. It seems well enough protected from dust. The only exposed works are underneath. There is room to mount it within your current Microbee disk drive unit under the drives. But this is awkward for me as it would be too low down — and cutting a hole in the plastic to do this seems like unnecessary work.

Copying IBM Clone Files

Recently I had to transfer many WordStar files over from my Mitac to my 128K Microbee. There's a very useful program called Bee Alien that will do this for you — but beware — it has some bugs!

I had a 111K file to move across. Bee

Alien got to work and told me that it had completed the task.

Like the classic science fiction alien, it lied through its teeth. It only had shifted 43K across! Dismayed at this I broke my original file down into three on the Mitac. I tried again.

The treacherous program refused now to move over any files longer than 32K. I found by experiment that this seemed to be its normal Work To Rule practice. So back onto the Mitac — and I successfully transferred my original file across in five parts.

The sneaky thing (yes — it just happened to me and I am still smarting) seems to possibly have another dirty trick up its sleeve.

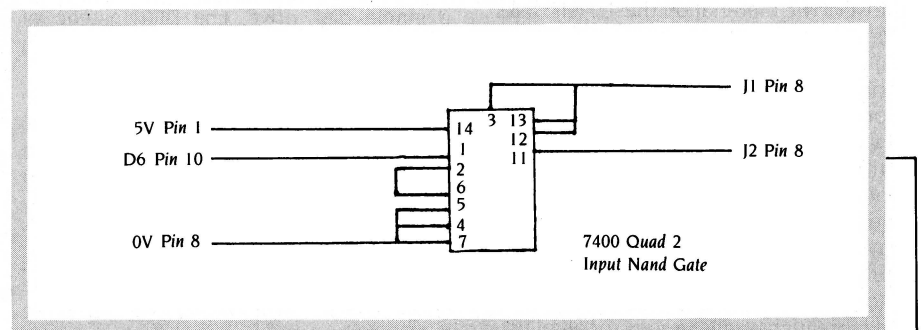
I had to expand some abbreviations in one of the transferred files — using the 'Find' and 'Replace' command in WordStar. This threw me either right out of WordStar to CP/M, or it did a boomerang trick and threw me out only to automatically load WordStar and my file again — needless to say without all my recently unsaved changes.

I suspected a poorly transferred file. So I went back and collected another copy of my Mitac disk and Bee Aliened it across again. All now worked perfectly.

It could still be a bug in my computer tonight — but I suspect Bee Alien.

So if you have this program, watch it! It may try to waste your time!

See you next month. Happy Computing. □



KEITH WESTLEY'S circuit diagram for two joysticks using the parallel port of his 32K Series 3 Microbee — The circuit uses the data line number 6 to select between the two joysticks, the circuit works by toggling the negative rail to the joysticks using two inverters and a nand gate. To cut the chip count, the inverters are made by connecting the nand gate input pins together.

All other pins are connected directly from the computer to both joysticks, except pins 6, 7, 9, and 14, instead of just using out 1,255; to initialise the port, use out 1,191. When reading, do the same as if only one joystick was connected except just before each In (0), put Out 0,x, where x = 64 or 0 depending on which joystick is to be read. For more information on the Microbee standard joystick see 'Microbee Engineering Notebook' in 'Hackers Handbook.'

It is apparent that many new Amiga owners, and not only computing beginners, are frustrated at hearing about Public Domain goodies and not knowing how to get at them. This month we will start by having a look at Amiga Public Domain material.

FROM THE LETTERS I've received it is apparent that many new Amiga owners, and not only computing beginners, are frustrated at hearing about Public Domain goodies and not knowing how to get at them. I'll start this month by having a look at Amiga Public Domain material.

A talented and generous chap in the US by the name of Fred Fish (I kid you not!), has taken it on himself to gather together masses of items for the Amiga which circulate around bulletin boards, user groups, and so on. In this way he has now put together some 58 disks covering games to utilities, pictures of all sorts, languages, demo programs, and more.

Most of the material on these Fish Disks is Public Domain material; that is, it has been released by its author(s) for use and distribution without cost.

Some of the material is Shareware — software which is released for unlimited distribution *but* the author(s) would like anyone *using* the software to send them some money (usually a small amount and always less than you would pay for a similar product from a retailer). In this way the author(s) will be stimulated to go and produce more high quality goods for all of us.

Several Amiga dealers provide their customers with a valuable service by distributing the Fish Disks — making them available for copying during off-peak shopping hours. Steve's Communications in Fyshwick here in Canberra provides this service for their many happy customers

(and I'd be happy to give a free plug to any other dealers who let me know that they do too!).

OK, so having got one's own copies of some Fish Disks how do you get at the goodies? If you have a two-disk system it's easy, so I'll look at that situation first.

Boot your Amiga with your Workbench disk in the internal drive and place a Fish Disk in the external drive. Select the Workbench disk icon, then select the System drawer, and finally select the CLI icon. Now jump to the third paragraph down, headed 'All together now'.

If you don't have an external disk drive on your Amiga, don't despair. You can achieve the same results by using part of your computer's memory as a phony disk drive for the purpose. This technique is called a RAM disk for obvious reasons. Boot your Amiga with your Workbench disk. Select the Workbench icon, then the System drawer, and finally select the CLI icon.

Now you must copy some command files from your workbench disk into RAM so we can change disks. In the CLI window, enter `MAKEDIR RAM:C`. The `I>` prompt should appear on the next line to show the command has been performed. Now enter `COPY C/LIST RAM:C`. Next enter `COPY C/TYPE RAM:C`, then enter `COPY C/DIR RAM:C`, then enter `COPY C/CD RAM:C`. Finally enter `CD RAM:`. You may now remove your Workbench disk and insert your Fish Disk.

In the following instructions, if you have a single disk drive, use `DF0` instead of `DFx`. If you have two disks then you should type `DF1` instead of `DFx`.

In the CLI window, enter `LIST DFx:`. The Amiga will display a list of the Fish Disk contents. Among these contents will be a file called `README.LISTxx` (`xx` is a two digit number). Now type `TYPE DFx:README.LISTxx` and your Amiga will produce on screen the text in which Fred Fish describes the contents of the disk (Hit the space bar to stop the display, and the backarrow to restart).

Normally each item listed in the contents of a Fish Disk is in the form of a directory. To look inside one of the directories, let's assume that one of the directories is `HOBNOB`. Type `LIST DFx:HOBNOB` and the contents of the `HOBNOB` directory will be displayed.

Almost always within a directory is a file labelled either `README` or `README`. This is a text file which explains

the contents and operation of the material within the directory, and it is very important that you read this material before continuing.

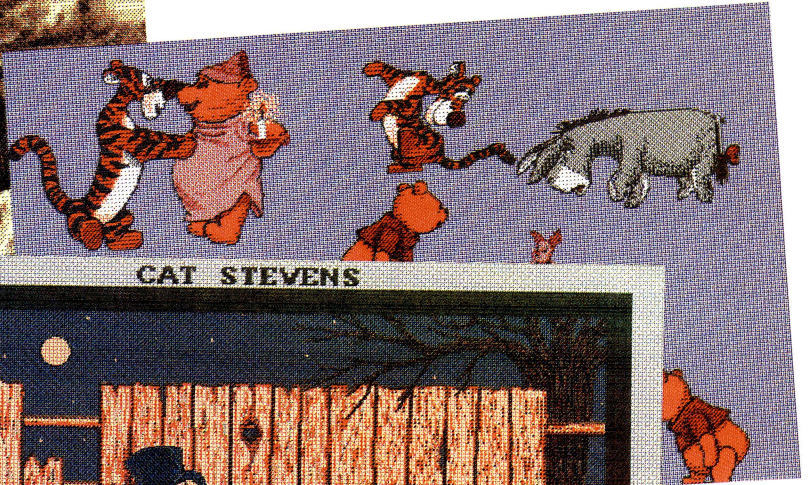
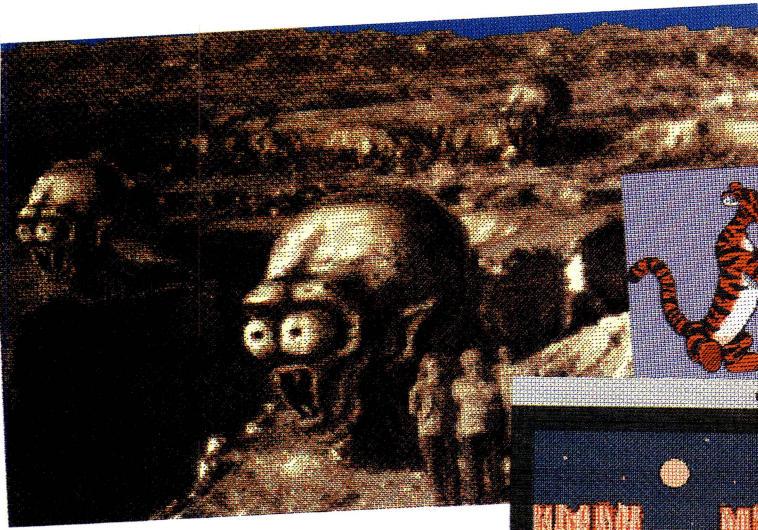
To display the text file enter `TYPE DFx:HOBNOB/README`. The text will be displayed on your monitor. If you have a printer attached, you can enter `TYPE >PRT: DFx:HOBNOB/README` and the text will be printed for later reference.

To go further requires a lot of explanation and/or a knowledge of other AmigaDOS commands. I will continue in another column when I will also give you a sample of some of the highlights from Fish Disks. In the meantime, if you set the Write Protect tab on your Fish Disk to the Protect position, you can experiment to your heart's content without fear of damaging anything. The worst that can happen is that the dreaded Guru Meditation will insist that you re-boot your system. Now for a change of pace, here's a look at some of the goodies available now for your Amiga.

The Insider

The Insider is a 1 Mbyte memory expansion module which fits inside your Amiga and lifts your total RAM to 1.5 Mbytes. This is particularly useful for anyone who is playing with animation and music and, like me, keeps running out of memory. The Insider also has a battery backed real time clock built in, so no more need for setting time and date. I haven't yet had the opportunity to test the device to see whether it really is as good as it sounds but, as soon as I do, I'll let you know. With an rrp of \$859 it looks like reasonable value.

For those of us who dream of enormous RAM disks (sigh!) and tasks operating in a speedy blurr, the Xpander II might be just the goods. This is a box which sits alongside the Amiga and plugs into the expansion port. The Xpander II comes with a 2 Mbyte board already plugged in, and a slot for another board. The second board can be another memory board (giving 4.5 Mbytes total) or a SCSI Multifunction Board. The Multifunction Board allows you to connect a hard disk drive, a modem or an extra printer or RS232 device. With an Xpander II, I imagine I'll never see that cursed 'out of memory' message again. (Price is about \$1600, but it's only money!!)



The rest of us who have to work for a living can take a good look at the Alegra expansion device. It's a neat little box which cuddles up against the side of the Amiga and plugs into the expansion port. Standard configuration is with 512K of extra memory for about \$750, but it's socketed and will accept up to 2 Mbytes of chips. This means that a 2 Mbyte Alegra would set you back about \$1200, not prohibitive for an extra 1 Mbyte of fast RAM. All of the expansion devices mentioned are Auto-Configuring, which means that when you start up the Amiga it automatically 'sees' that the extra memory is available and uses it.

There is some excellent software available for the kids in the family. First Shapes and Kidtalk are both aimed at pre-schoolers and seem to be good value for \$155 each. Kidtalk uses speech to develop reading and writing skills while First Shapes talks its way through simple geometry.

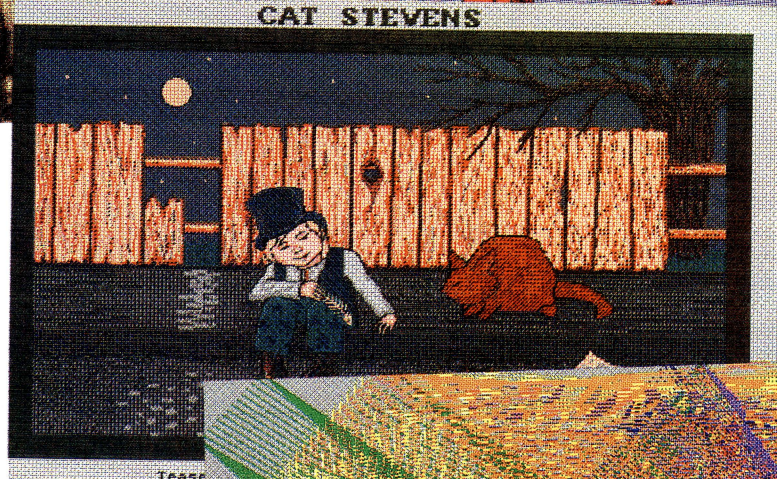
Mathtalk is another education package, this time aimed at primary school level, which uses the speech capability of the Amiga.

Then there is *The New Technology Colouring Book* which is full of images from the world of science for the anklebiters to colour in, and only \$50 too.

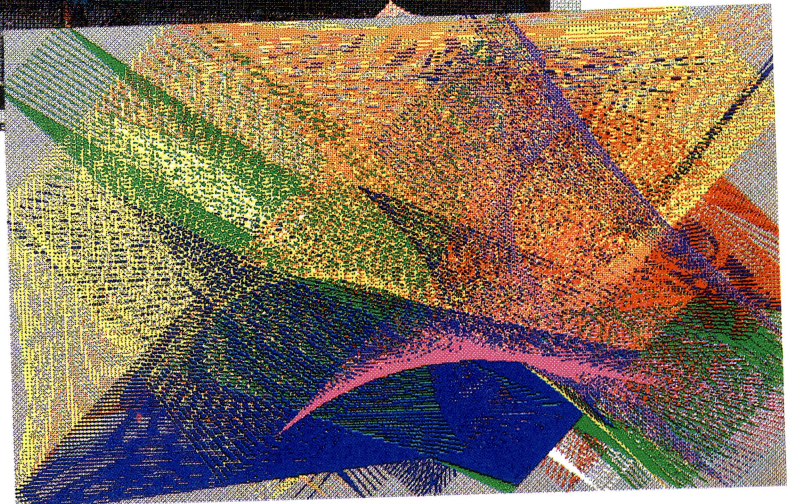
The Perfect Sound stereo sampler is a full stereo digitizer from SunRize Industries. It samples at around 28 KHz which should permit a frequency response of about 7 KHz (not to be sneezed at!). The sound can be displayed as a graph and fiddled with. Sounds good at \$199.

For those long cold winter nights there's Strip Poker at \$65.95 and for the real deviate Leather Goddesses of Phobos even provides a scratch'n'sniff selection of 'off' fragrances and your choice of three levels of lewdness, (\$89.95 for the desperate).

A couple of excellent books are available and should become part of every Amiga owner's library. The first is *Compu's Kids and the Amiga* which the cover claims is for 'kids 8 to 80'. It's a first rate



These are some of the images from the 58 disks currently in the Fred Fish 'collection.' The disks cover a variety of topics including games, utilities, languages, demo programs and pictures of all sorts.



guide to Amiga Basic with everything explained in non-technical terms and with heaps of illustrations and examples. Even The Cook got into this one (and her lips move when she reads!). Topics include 'adding music to any program', 'making Amiga talk', 'creating color graphics' and much more. Excellent value — highly recommended.

The *Amiga Programmer's Handbook* is a vital source of information on data management, ROM library, Library management and so on. Vital for any serious Amiga programmer.

And finally, don't forget the AmigaDOS Manual (the one Commodore should have packed with the machine!). It will open up the world of DOS to you, without it you're only using half your Amiga.

Getting Rid of the Jitters

Now for the crazy product of the month time. A 'jitter removing screen cover' is

being sold around the traps for about \$50. Do yourself a big favour and run quickly in the opposite direction. It doesn't really eliminate the interlace jitter at all. The same effect can be achieved at home by using a pair of your girlfriend's/wife's/sister's black panty-hose.

Cut a cylinder about 25 cm long (unstretched) from the top end of one leg (make sure it's not being worn at the time!), and stretch it around a cardboard frame which fits around your monitor screen. Tape the assembly across the front of your monitor and, *hey presto!* Even if it doesn't work, think of the money you've saved.

This month's graphics are from Fish Disk No.45 and are HAM hi-res images which look great onscreen. Keep those cards and letters pouring in, especially the ones for Dear Guru. Cheers for now. □

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M. H. Babani, B.Sc.(Eng) BP0027
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BUILD YOUR OWN SOLID STATE HI-FI AND AUDIO ACCESSORIES
M. H. Babani BP0220
 An essential addition to the library of any keen hi-fi and audio enthusiast. The design and construction of many useful projects are covered including: stereo decoder, three-channel stereo mixer, FET pre-amplifier for ceramic PUs, microphone pre-amp with adjustable bass response, stereo dynamic noise filter, loud-speaker protector, voice-operated relay, etc.

\$6.00
 96 pages

AUDIO PROJECTS
F. G. Rayer BP0090
 This book covers in detail the construction of a wide range of audio projects. The text has been divided into the following main sections: Pre-amplifiers and Mixers, Power Amplifiers, Tone Controls and Matching, Miscellaneous Projects. All the projects are fairly simple to build and have been designed around inexpensive and readily available components. Also, to assist the newcomer to the hobby, the author has included a number of board layouts and wiring diagrams.

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COMPONENT SPECIFIC

MODERN OP-AMP PROJECTS
R. A. Penfold BP0106
 Includes a wide range of constructional projects which make use of the specialised operational amplifiers that are available today, including low noise, low distortion, ultra-high input impedance, low slew rate and high output current types. Circuits using transconductance types are also included. All of the projects are fairly easy to construct and a stripboard layout is provided for most of them so that even constructors of limited experience should be able to build any of the projects with the minimum of difficulty.

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MODEL RAILWAY PROJECTS
R. A. Penfold BP0095
 The aim of this book is to provide a number of useful but reasonably simple projects for the model railway enthusiast to build, based on inexpensive and easily obtainable components. The projects covered include such things as controllers, signal and sound effects units, and to help simplify construction, stripboard layouts are provided for each project.

\$8.50
 112 pages

AERIALS

AERIAL PROJECTS
R. A. Penfold BP0105
 The subject of aerials is vast but in this book the author has considered practical aerial designs, including active, loop and ferrite aerials which give good performances and are relatively simple and inexpensive to build. The complex theory and mathematics of aerial design have been avoided. Also included are constructional details of a number of aerial accessories including a pre-selector, attenuator, filters and tuning unit.

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25 SIMPLE AMATEUR BAND AERIALS
E. M. Noll BP0125
 This concise book describes how to build 25 amateur band aerials that are simple and inexpensive to construct and perform well. The designs start with the simple dipole and proceed to beam, triangle and even a mini-rhombic made from four TV masts and about 400 feet of wire. You will find a complete set of dimension tables that will help you spot an aerial on a particular frequency. Dimensions are given for various style aerials and other data needed for spacing and cutting phasing lengths. Also included are dimensions for the new WARC bands.

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 Fortunately good aerials can be erected at low cost, and for a small fractional part of the cost of your receiving equipment. This book tells the story. A series of 25 aerials of many different types are covered, ranging from a simple dipole through helical designs to a multi-band umbrella.

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 Written for those people who live in flats or have no gardens or other space-limiting restrictions which prevent them from constructing a conventional aerial system. The 25 aerials included in this book have been especially designed, built and tested by Mr. Noll to be sure performers and give surprisingly good results considering their limited dimensions.

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FAULT-FINDING

HOW TO GET YOUR ELECTRONIC PROJECTS WORKING
R. A. Penfold BP0110
 The aim of this book is to help the reader overcome problems by indicating how and where to start looking for many of the common faults that can occur when building up projects. Chapter 1 deals with mechanical faults such as tracing dry joints, short-circuits, broken P.C.B. tracks, etc. The construction and use of a tristate continuity tester, to help in the above, is also covered. Chapter 2 deals with linear analogue circuits and also covers the use and construction of a signal injector/tracer which can be used to locate and isolate the faulty areas in a project. Chapter 3 considers ways of testing the more common components such as resistors, capacitors, op amps, diodes, transistors, SCRs, unijunctions, etc., with the aid of only a limited amount of test equipment. Chapter 4 deals with both TTL and CMOS logic circuits and includes the use and construction of a pulse generator to help fault-finding.

\$8.50
 96 pages

TRANSISTOR RADIO FAULT-FINDING CHART BP0070
C. E. Miller
 Used properly, it should enable the reader to trace most common faults reasonably quickly. Across the top of the chart will be found four rectangles containing brief descriptions of these faults, viz — sound weak but undistorted, set dead, sound low or distorted and background noises. One then selects the most appropriate of these and following the arrows, carries out the suggested checks in sequence until the fault is cleared.

\$4.00
 Chart

ELECTRONIC & COMPUTER MUSIC

ELECTRONIC MUSIC PROJECTS
R. A. Penfold BP0074
 Provides the constructor with a number of practical circuits for the less complex items of electronic music equipment, including such things as fuzz box, waa-waa pedal, sustain unit, reverberation and phaser units, tremelo generator, etc. The text is divided into four chapters as follows:

Chapter 1, Guitar Effects Units; Chapter 2, General Effects Units; Chapter 3, Sound General Projects; Chapter 4, Accessories.
 \$9.50

112 pages

ELECTRONIC SYNTHESIZER CONSTRUCTION
R. A. Penfold BP0185
 Should enable a relative beginner to build, with the minimum of difficulty and at reasonably low cost a worthwhile monophonic synthesiser, and also learn a great deal about electronic music synthesis in the process. This is achieved by considering and building the various individual parts of the circuit that comprise the whole instrument as separate units, which can then be combined together to form the final synthesiser. Printed circuit designs are provided for these main modules. Later chapters deal with sequencing and some effects units.

\$11.00
 112 pages

MIDI PROJECTS
R. A. Penfold BP0182
 Provides practical details of how to interface many popular home computers with MIDI systems. Also covers interfacing MIDI equipment to analogue and percussion synthesisers.

\$11.00
 112 pages

MORE ADVANCED ELECTRONIC MUSIC PROJECTS
R. A. Penfold BP0174
 Intended to complement the first book (BP74) by carrying on where it left off and providing a range of slightly more advanced and complex projects. Included are popular effects units such as flanger, phaser, mini-chorus and ring-modulator units. Some useful percussion synthesisers are also described and together these provide a comprehensive range of effects including drum, cymbal and gong-type sounds.

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 96 pages

COMPUTER MUSIC PROJECTS
R. A. Penfold BP0173
 Shows some of the ways a home computer can be used to good effect in the production of electronic music. Topics covered include sequencing and control via analogue and MIDI interfaces, computers as digital delay lines and sound generators for computer control.

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 112 pages

MISCELLANEOUS

COIL DESIGN AND CONSTRUCTION MANUAL
B. B. Babani BP0160
 A complete book for the home constructor on "how to make" RF, IF, audio and power coils, chokes and transformers. Practically every possible type is discussed and calculations necessary are given and explained in detail. All mathematical data is simplified for use by everyone.

\$9.50
 96 pages

AN INTRODUCTION TO Z80 MACHINE CODE
R. A. & J. W. Penfold BP0152
 Takes the reader through the basics of microprocessors and machine code programming with no previous knowledge of these being assumed. The microprocessor dealt with is the Z80 which is used in many popular home computers and simple programming examples are given for Z80-based machines including the Sinclair ZX-81 and Spectrum, Memotech and the Amstrad CPC 464. Also applicable to the Amstrad CPC 664 and 6128.

\$10.00
 144 pages

A Z-80 WORKSHOP MANUAL
E. A. Parr BP0112
 This book is intended for people who wish to progress beyond the stage of BASIC programming to topics such as machine code and assembly language programming, or need hardware details of a Z-80 based computer.

\$12.00
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*The thought behind Telix
can best be seen by
looking at the Screen and
Colour setting sub-menu.
As the settings for the
various colours appear, a
sample window displays
the effects of the settings
concerned.*

The Sample Session

AFTER YEARS TOGETHER I have finally been unfaithful to my communications true love. Yes, PC-TALK has been discarded and replaced on my system with Telix.

When starting Telix for the very first time you type in Telix from the DOS prompt which loads it. A message screen scrolls up from the bottom. After 25 seconds, or sooner if a key is pressed, it disappears.

Telix then looks for its configuration file, Telix.CNF. If it is not found, Telix automatically goes to a simple menu-driven configuration procedure.

First selection is for the screen/display adapter combination. Next selection is the maximum baud rate of the modem; speeds from 300 to 19200 baud are supported. Selection of the default communications port can then be made between COM1 and COM2.

Telix then sends a initialisation string to your modem. Hayes compatible modems like the Netcomm 123A are assumed, but Telix can be configured for others. Terminal mode is then automatically entered. If Telix.CNF file was found, Telix reads it and jumps straight from the welcome screen to modem initialisation to terminal mode.

Status Screen

Pressing the Home key pops up a status screen. Pressing Alt, plus another key, either from terminal mode or with the status screen showing, accesses all functions.

The effect of the various Alt combinations is shown on the status screen. Also listed is information like the length of time the session has been going, the communications parameters in use and other details.

When sending or receiving files pressing PgUp initiates sending and PgDn, receiving. First appears a list of available protocols, including ASCII, Kermit, Modem7, Sealink (very important when using OPUS boards), Telink, XModem, Relaxed Xmodem, Ymodem and Batch Ymodem. In that lot you should be able to contact *any* host system!.

Assume that we are downloading from an OPUS board using Sealink protocol. After telling the remote board which file to send and to use Sealink, we press PgDn. The protocol selection appears. Pressing S selects Sealink. The sending end then sends the name of the file being downloaded and its length in bytes and blocks, invisibly to the user.

A window pops up showing the file name being transferred, the error correction method being used, the transfer time, elapsed time, blocks expected, blocks received, bytes received and the number of errors. As the file transfer proceeds the display is updated for bytes and blocks received and time elapsed. At the end of the file transfer a tune sounds to alert the user, the popped up window disappears and the previous screen is restored.

Uploads send to the host the name and date of the file being transferred and eliminate the chance of a typographical error in renaming a file. I should mention that Telix pops up option screens and restores the previous screen when the popped-up screen is removed.

Dialling

Pressing Alt-D brings up the dialling directory. A number of different directories can be created and independently used. The default is on the same drive and directory as the Telix program file and is Telix.FON.

Up to 150 entries may be made in each directory, of which 15 are shown at any one time. The name for each entry, the phone number (up to 11 digits), communications parameters and script file name are contained. You can create a script of expected questions from your target BBS, and the answers to them, so that logon is fully automatic.

Actions which can be taken on the dial directory are Dial, Find, Manual, Edit, Clear, Insert, Delete, Long Distance Codes,

Directory Options, and Exit. When selecting the directory entry to be dialed, up to 10 can be specified at a time and will be redialed until one is free and answers.

Long Distance codes require some explanation. If you wish to dial to the US you must first access ISD with four digits, specify the foreign country with one to three digits, specify the area code in that country with three and then the phone number with seven. This totals 17 digits, six more than will fit in the phone number. The solution is to define the characters !, @, — and + as strings of numbers, and then use them within the phone number.

Typically one would use them for the ISD access code and country code. Imagine dialling (212)-696-0360 in New York City. The ISD access is 0011 and country is 1. Attach 00111 to the ! symbol in the Long Distance code, and make the entry for the BBS concerned !-212-696-0360.

The whole business of maintaining and using the directories is simple and easy.

Configuration

Pressing Alt-P makes quick and immediate changes to the communications parameters. Up comes a window showing the current speed, word length, parity and number of stop bits along with the comms port in use — COM1 or COM2.

Pressing any key from A to F selects a speed from 300 to 19200 baud. Pressing M toggles between the communications ports. Pressing G, H or I selects the parity while J, K and L toggle the setting for word length, stop bits and echo. Pressing Enter returns to terminal mode with the new settings. Could anything be faster?

Permanent settings are made from a menu accessed by pressing Alt-O. Settings can be made under seven sub menus — Screen and Colour, Modem and Dialing, Filenames and Paths, General Settings, Kermit Transfers, ASCII Transfers and Host Mode Settings. In each case the settings can be retained for the current setting or written to the configuration file on disk as the defaults for subsequent sessions.

The thought behind the program can best be seen by looking at the Screen and Colour setting sub-menu. As the various settings for foreground colour, background colour, intensity, menu bar appearance, and so on, are varied by moving a bar down a list of colours, a sample window displays the effect of the setting concerned.

Press Alt-Y and you go to Chat mode which divides the screen. The characters from the remote computer use the top 75 per cent of the screen and the characters from the local computer are in the bottom.

When the desired effect is achieved it is held by pressing Enter. When all selections have been made, returning to the first level menu enables the writing to disk of the new screen characteristics. One can even choose the method of writing to the screen from three options, including direct writes to screen, port checks with direct writes and BIOS calls used for writes.

Chat Mode

Ever been on line and had the sysop chime in with a greeting? Gets a bit confusing when the characters you are sending

get mixed on screen with the ones being received, doesn't it? With Telix, simply press Alt-Y to go to Chat mode. The screen divides, and the characters from the remote computer use the top 75 per cent of the screen and the characters from the local computer are in the bottom.

Host Mode is not quite a BBS, as the security is not really good enough. Host mode is accessed by pressing Alt-Q which allows the system to answer the phone and allow uploading and downloading of files from the remote end. ▶

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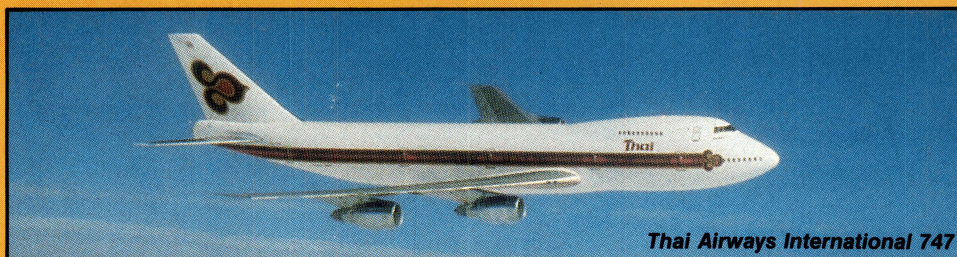
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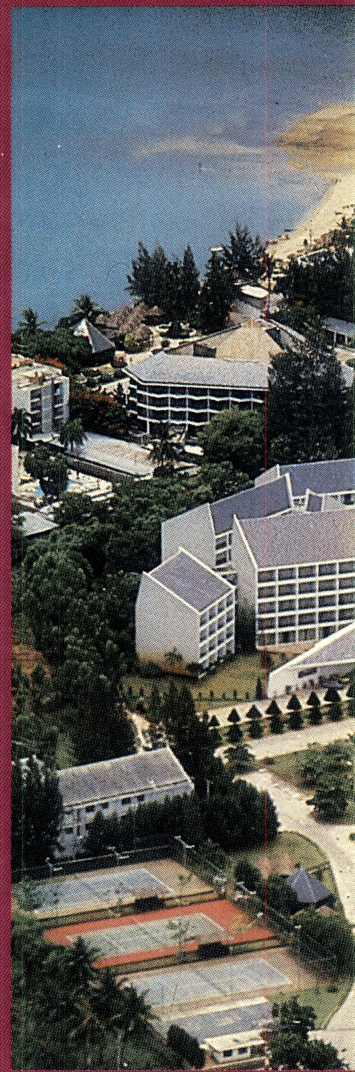
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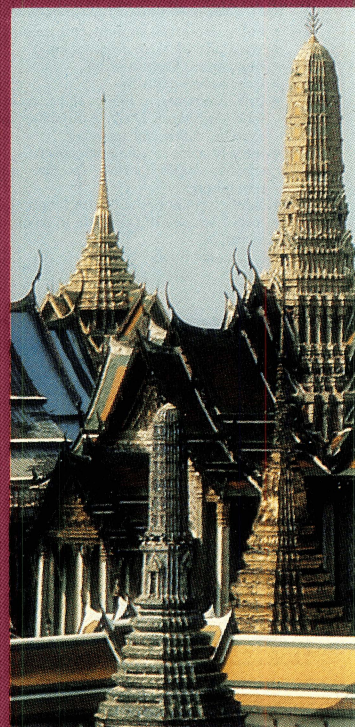
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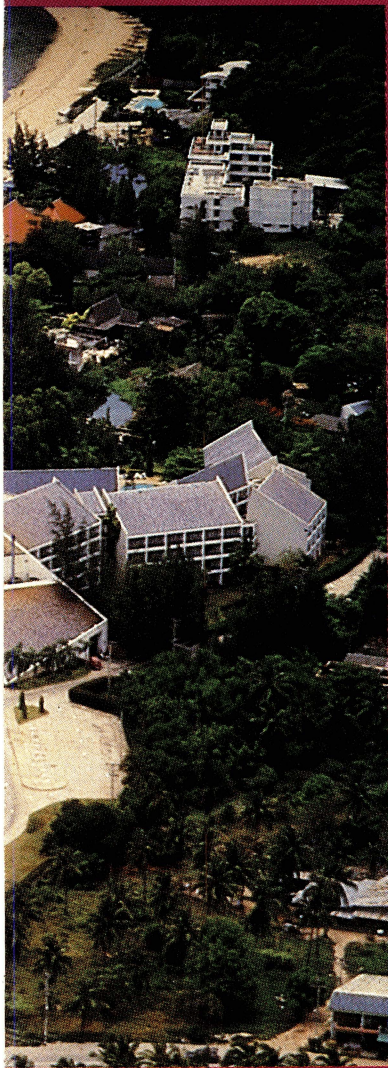
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Access by the remote computer to DOS on the host is available, with only password protection, and well behaved programs can be run from the remote end. Don't try to run something like Lotus which makes its own arrangements to read keyboards and write to screens, but some databases could be accessed reliably from a remote point this way.

The usual features of good communications programs are available. Many bulletin boards are now using the ANSI graphics standards to give colour and intensity control to the characters being sent. Alt-G toggles on or off Telix's ability to interpret them. Alt-I captures the screen image to a file, Alt-L logs the session to a file, Alt-V allows a DOS command to be used, including running other programs from inside Telix.

An excellent manual on disk is provided. It is complete with index and contents and is a model of completeness and conciseness.

Up to 150 entries may be made in each directory, of which 15 are shown at any one time.

Availability

Telix is a product of PTel, 276 Guildwood Parkway, Toronto, Ontario, M1E 1P9, Canada. The author is Colin Sampaleanu. It is User Supported software, not Public Domain, and while you are encouraged to freely copy, and distribute it, users are requested to send the unbelievably small donation of US\$25 or Canadian \$34 to the author.

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The version of Telix tested is 2.12, and was obtained from Bill Bolton's superb Software Tools Bulletin Board on (02) 449 2618, as Telix212.ARC. A copy is now on the Your Computer Bulletin Board on (02) 669 1385. You will need a copy of ARC or PKARC, or PKXARC to extract the component files.

Conclusion

When you hear of menu driven programs you tend to think of unnecessary delays and tedium for the experienced user. Not so with Telix. It doesn't have that first level menu, and jumps straight into terminal mode, ready for action. Several menus are available by pressing those Alt key combinations, and even the most complex configuration function is only a couple of menu levels away, while the most common are there immediately. I have found it to be the very best communications package I have ever used. Top marks! □



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Sharing it Around

A FEW YEARS ago when they first coined the term 'personal computer', all the ads promoted the value of one computer to one worker. Gone were the days when work-stations were linked by umbilical cords to a mainframe.

These were the heady days of personal computing. No longer did you need to share computing time or resources. You now had your own database and you wrote with the word-processor of your own choice — not the crud imposed on you from the dungeons of the DP Department.

Well, now that we've all got our own PC sitting on our desks, what do we do with them? We've played with wordprocessing, made a few economic forecasts from our spreadsheets, produced some pretty reports, and kept our telephone lists on a database. In the words of the song, 'Is this all there is...?'

Of course not! If we are in a large company environment, we immediately try to link all our PCs up through umbilical cords again to a mainframe, mini, or a super-micro acting as a file server.

The Year of The LAN?

The famous 'Year of the LAN' didn't ever really happen. It was promised in 1985, again in '86, and once more in '87. But LANs have quietly entered corporate lives; less with a bang and more like a whimper.

Slowly and steadily medium-size and larger companies have been introducing PC networks, and the installation horror stories of the first few years are gradually fading into distant memories.

Apple were late into the LANs arena, and they haven't appeared to be in too much of a hurry to develop their system. Appletalk for the Macintosh came onto the market quite a few years ago, but it wasn't really a LAN system because it lacked a disk-server or true file-server until recently.

The early Appletalk cables merely provided a convenient way for a number of Macs to share an expensive Laserwriter or Imagewriter II. Fortunately, the Mac already had much of the hardware, so connection was a simple matter, but it couldn't do much. Also, many people objected to the term LAN being applied to Appletalk at all.

Splitting up the Hard Disk

More recently, we've seen the release of Infosphere's Mac Serve, a disk server which physically divides up a hard disk into user-areas. Mac Serve started to give respectability to Appletalk as a LAN, but it still had a long way to go.

In September last year Centram released Tops, which provides a bridge between the Mac and MS-DOS environments. Tops is a distributed file server that allows Appletalk users to link in DOS-based machines. You need Tops software for the Mac and an interface board and software for the IBM PC.

Tops is compatible with MS-DOS 3.1 and 3.2, and once installed on the PC it is memory-resident, so users are only aware of the program's presence when they deliberately choose to access the network.

Another more recent development is Phone-Net, which is an alternative cabling scheme for Appletalk networks that uses ordinary telephone wire and is capable of extending the network far beyond the 300 metre limit. Phone-net links are cheaper, and have been successfully run over distances up to 2.5 kilometres.

The latest in the line of Mac LANs products, of course, is Appleshare from Apple itself. This is a true file-server like Tops, but the files are not 'distributed', they are centralised on one Mac.

Appleshare requires the dedication of one hard disk based Macintosh as the physical centre of the network topology. This dedicated Mac can be a 512, Plus, or an SE; and you'll also want at least one 20 megabyte hard disk unit.

Any hard disk that is compatible with the new Hierarchical File System (HFS) can be used with the Appleshare server, and each server can have up to two HD 20s and seven SCSI hard disk units — totaling quite a few hundred Mbytes if you need them.

On each individual Mac workstation, Appleshare consists only of system software installed on the startup disk. All the LANs' operations are controlled through a comprehensive desk accessory called Access Privileges and through the Finder. The Chooser desk accessory is also modified during the installation of Appleshare, so that access can be first selected.

Once this very simple installation procedure is completed on all stations, you have a full-featured and largely transparent file service scheme for up to 25 Macs through the Appletalk network. It is

one of the best work-group LANs available — but it does have its limitations.

Appleshare doesn't partition the disk for each user, it dynamically allocates space on the disk as needed and then recovers any disk space released by a workstation.

To access the system, you need to create 'accounts'. You can have as many accounts as you need, but only 25 can be active at any one time. Also, you can set access levels, passwords, and so on. Appleshare is fully integrated with the Finder for access and display of volumes, folders and files.

There's an administration system within the server software which provides reports of network activity. This Administration system can be used to control access to users' private folders, change ownership of folders, and handle deletes.

Most current application programs for the Mac were developed before Apple published its recent Apple Filing Protocol standard for file server software. If one user is making a change to a file with these single-user applications, and another user enters the scene and tries to use the same file, all sorts of problems will occur.

These programs don't know how to function in a shared environment but most will run on Appleshare if each copy is only opened by one Mac at a time. Switcher seems to be the notable exception — it doesn't work very well at all. Until multiuser versions appear, the solution is to store your documents in private folders. (Blyth Software have been very quick off the mark with Omnis 3 Plus for Appleshare).

As LANs users are beginning to discover, a network administrator is needed with any kind of LAN system; and for large systems you need this person to be virtually full-time. Apple are giving their dealers special network training and those dealers will offer buyers of Appleshare a two-day network administration course.

Anybody with LANs experience will tell you that the addition of a new workstation to a LAN can involve many frustrating hours of work. Fortunately, Appletalk is the world's easiest LAN to install, and Apple has managed to achieve the impossible twice because Appleshare is also dead easy — but there are still a few bugs in the system. ▶

Linking up the hardware consists of plugging in a couple of connector taps to the serial port of each Mac and hooking these together with Appletalk cable. The Installer program works without fuss. The Administration program is then used to set up user-accounts for each workstation and define access privileges to existing folders on the server disk.

From the user's point of view, the system is virtually invisible. Files and disk drives appear on the desktop in exactly the same way as before, and applications programs and files can be copied to the server as if no network was in the pathway.

Each user has direct control over storing and using his or her own files from the server, and can also decide which files or folders can be listed, read or written to by other users on the system. Levels of access to files on the server can be defined using a password scheme.

Although the file server can't be used for other purposes while the network is running, Appleshare can install concurrent server applications — for instance, electronic mail. Internet has recently released Intermail which operates in the background on the server and requires only 64 kilobyte of memory.

Intermail allows users to run their own applications programs while simultaneously transferring or receiving text or

graphics messages — both within the LANs environment or outside. It has a Background Modem-Serving function through which you can designate the message recipient and the location. Intermail will then seek a free modem on the network and send the information automatically.

Appleshare

There are obviously still quite a few new developments still to come on Appleshare. As yet there is no serial or parallel print-spooler, or provisions for a SCSI tape backup. However Apple has just announced Lasershare, a laser print-spooler, and it is making the Appletalk PC Card for IBM PC. Presumably IBM installation software will soon be available, which will widen the system's appeal.

At present, the PC card only lets MS-DOS machines access Apple's Laserwriter. It comes with software that allows you to convert MS-DOS text file formats into Postscript files, but at this time neither the Appletalk PC Card or the Tangent Technologies recently announced Appletalk card will let you use an IBM PC with the Appleshare file server.

So Appleshare is an important development for the Mac, but it is only part of the new role that Mac connectivity is now playing in the corporate world. Recently two US companies, Alisa Systems and Ki-

netics created the hardware and software necessary to allow the Mac and DEC VAX machines to share resources. There has been a lot of talk about Mac-to-VAX over the years, but mostly the products have been vapourware.

Kinetics came up with an Appletalk-to-Ethernet bridge and Alisa has produced software that makes the VAX think that it is an Appletalk bus. These developments allow a number of Appletalk networks to use the VAX as a file-server.

The Fastpath bridge, from Kinetic, allows the network packets to zap between Appletalk and Ethernet. Any network on the same bus can communicate with another through a gateway; special zone-information protocols are used to group buses into geographic zones.

Apple obviously see the link to DEC VAX systems as important. They were closely involved in the Alisa and Kinetics developments, and they are jointly working with 3Com Corp to produce an Ethernet adapter for the Mac SE and II.

These developments will provide a faster medium for the Appletalk network and also allow Mac users access to DEC solutions. At present, Appletalk only ambles along at 230 kilobits/sec, as against Ethernet's speed of 10 Megabits/sec so DEC power and Ethernet speed are important to Apple. □

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■ I WAS AT A meeting of my favourite user group when a member asked if anyone knew of a good modem for his computer.

We were all a bit surprised as he had been singing the praises of his modem the previous month, and he was so 'into' computers that we hardly thought he needed a keyboard or screen to talk to his machine, just an RS232. We found out that his modem had fallen out of bed and broken.

He eventually admitted that he was IN BED with the computer and had got up to go to the loo and tripped over the modem cable. He claimed to be sick at the time — I would have too.

He no longer attends the user group, so it is possible that he and the new modem are having a meaningful relationship, same time, same place. I'm waiting for the wedding invitation.

■ For the man with everything except a few crucial neurons, there is an electronic wallet for just \$25. It makes sure that his three credit cards are replaced before the wallet is closed. Anyone with that sort of money probably has more than three cards, so he needs several wallets.

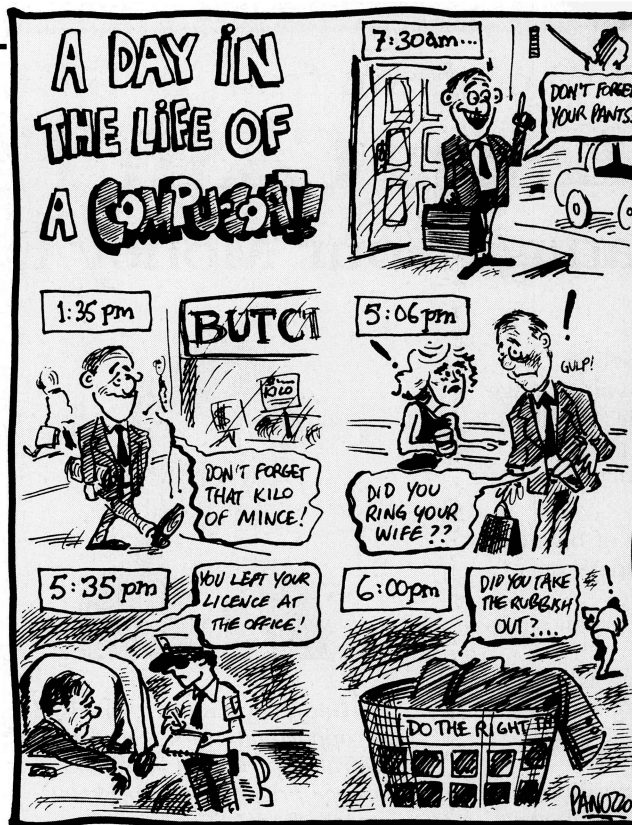
Next comes Compusuit, a suit which won't let you walk more than ten paces without all your wallets, pocket photocopier, laptop computer and keys. There is a dedicated standalone device which works in a similar fashion already. It is called a secretary and has lots of other advantages which are unlikely to be automated in the near future.

■ Parents of today and the future, give your kids short names. The ideal is no more than eight then three alphanumeric characters and no symbols. It makes it so much easier to keep track of the kids and for the rest of the world to write to them. Life imitates technology.

■ These hand-held photocopiers which are popping up everywhere for a mere \$900 or so make me wonder when we will have similar-sized intelligent printers. They have names like Copy-Jack and descriptions such as 'the perfect business and study accessory'.

The most staggering thing about them is that they hold a roll of paper 46 mm wide and 10 metres long, that's a lot of paper. The resolution is about 8 dots per mm or 200 dots per inch, pretty sharp.

The present ones operate on thermal paper and mostly depend on you to pull the paper through, thus eliminating the need for a motor. Perhaps a pocket laser is



a possibility, or even one built in to a lap computer. Ah, Laptop Publishing, the next phase once we all have our Desktop Publishing systems installed.

■ 'Computer widow' is a term coming into fashion in the way that golf widow did in the 40s or 50s. There are still very few computer widows who are male ('widower' is a sexist term and no longer current for the male).

However there are a few kinds of various genders who are orphaning themselves and possibly cutting off their social links generally by spending all their time at the computer screen. Maybe they will be like the TV generation of the 60s and 70s who were supposedly ruining their social lives by over-relating to Bugs Bunny and

others. I'm not sure that that prediction came true. Twenty more years and we will know whether the computer is evil at that level.

Bootstrap

As far as I'm concerned, desktop publishing is a misnomer because it is usually used to refer to desktop typesetting.

But this is a bit wide of the mark too, because when it is performed on most of the laser printers on the market, it is only near-typeset quality. Perhaps we need a new term, NTO, just as we did for near-letter quality (NLQ) which was not daisy wheel quality and was often not even close.

NLQ covered a multitude of sins. Some makers had a category called correspondence quality which seemed to indicate that they thought the mail was mostly junk anyhow.

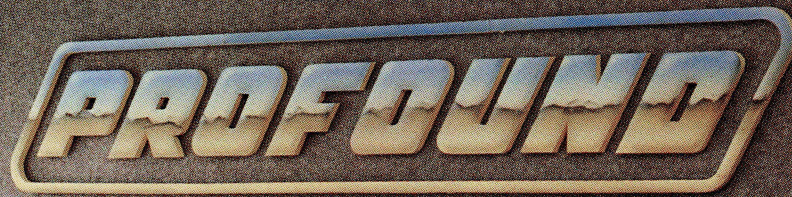
Perhaps the only true desktop publishing system is one connected to a modem and sending the information out to the recipients. This is what is often known as electronic publishing.

It really is publishing because it includes getting the information out to the public, which is what it is all about. Regardless, I suspect we are stuck with the term desktop publishing for NTO typesetting.

Michael Burlace is an independent computer consultant operating from the Sydney Information Technology Centre (Itcc). He may be contacted by writing to PO Box 57, Broadway 2007 or by phoning (02) 281 2111. □



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Its 1 Mb RAM is standard (upgradeable to 2Mb) providing for full A4 page graphics and crisp, clear 300 DPI images.

The Ricoh PC Laser 6000 also features: Diablo 630* and Ricoh Graphics emulations are standard. Compatibility with all leading software is assured. HP LaserJet Plus*, IBM Proprinter*, and Epson-FX* emulations are options which will ensure superb performance from your Ventura* and PageMaker* or any other leading desktop publishing software.

In addition to the standard paper input of 150 pages, the PC Laser offers an optional auxiliary paper input tray of 250 pages — letterheads in one, follow-on in the other or any combination you like!

Ricoh's front panel is especially user friendly — all functions of the printer are easily and comfortably available.

Of course another benefit you'll enjoy is the professional advice and service from a company with the computer know-how of Mitsui Computer.

You've read some of the features. Now call us for the sensational price of the remarkable Ricoh PC Laser 6000.

* Trademarks of the respective owners.

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